DECEMBER 1954

chemical processing

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Putman Publishing Company

CREATORS OF *Putman-Style* MAGAZINES

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how to control it
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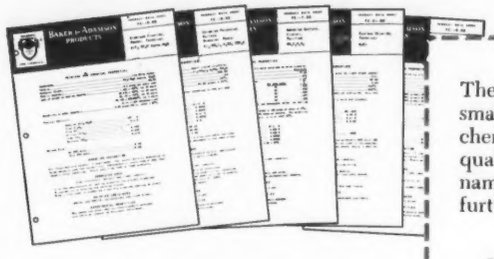
Sinclair's Marcus Hook Refinery
COMBATS TUBE BUNDLE CORROSION
See Page 52

For Production and Research Men who use High Purity Process Chemicals . . .



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☐ Acid Molybdic, 85% Purified	DA-31181
☐ Acid Oxalic, Anhydrous	DA-31341
☐ Aluminum Chloride, 32° Baume Solution	DA-83851
☐ Aluminum Fluoride, Powder, Technical	DA-32521
☐ Aluminum Nitrate, Crystal, Technical	DA-32341
☐ Aluminum Sulfate, Hexahydrate, Technical	DA-48871
☐ Ammonium Acetate, Crystal, Purified	DA-32711
☐ Ammonium Fluoborate, Crystal, Technical	DA-32731
☐ Ammonium Fluoride, Crystal, Technical	DA-32671
☐ Ammonium Oxalate, Granular, Purified	DA-33251
☐ Ammonium Persulfate, Crystal, 98%, Purified	DA-33091
☐ Ammonium Sulfate, Purified	DA-33151
☐ Ammonium Sulfite, Crystal, Purified	DA-33231
☐ Ammonium Thiosulfate, Solution, Technical	DA-85271
☐ Barium Fluoride, Technical	DA-34181
☐ Calcium Acetate, Powder, Purified	DA-34991
☐ Calcium Chloride, U.S.P.	DA-35011
☐ Calcium Chloride, Anhydrous, Purified	DA-49211
☐ Calcium Fluoride, Powder, Reagent	DA-35201
☐ Calcium Phosphide, Technical	DA-35341
☐ Chromium Fluoride, Technical	DA-35771
☐ Chromium Nitrate, Crystal, Purified	DA-35801
☐ Chromium Nitrate, Solution, Technical	DA-49711
☐ Chromium Potassium Fluoride, Purified	DA-35791
☐ Chromium Potassium Sulfate, Granular, Photo	DA-35841
☐ Cupric Acetate, Crystal, Technical	DA-36271
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☐ Cupric Nitrate, Crystal, Purified	DA-36412
☐ Cupric Nitrate, Solution, Technical	DA-49701
☐ Cuprous Chloride, Technical	DA-36571
☐ Ferric Nitrate, Crystal, Technical	DA-37441
☐ Ferrous Ammonium Sulfate, Crystal, Technical	DA-37571
☐ Ferrous Sulfate, Exsiccated, U.S.P.	DA-37671
☐ Hydrofluoric Acid, 48% (C.P.) A.C.S.	DA-49791
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☐ Zinc Formate, Crystal, Purified	DA-44441

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THAT'S INTERESTING

"Chauncey's gyro is jammed again!"

Non-spinning gyroscope had start with non-flying fly

A pair of rods beneath a fly's wing gave Sperry gyroscope engineers the clue they needed to confirm discovery of a gyroscope that doesn't spin. When the fly's rods were glued so they couldn't vibrate, level flight became impossible for the insect. Thus, The Sperry Corporation has developed an Inconel tuning fork for gyroscope use that mimics nature's oldest flight control.

Quiet!! Testing transformers

At one point in the Westinghouse Transformer Div. plant in Sharon, Pa., the huge units being tested are thunderously bombarded by 5 million volts and 275 thousand amperes worth of man-made lightning. And only a few feet away is one of the quietest spots in the world . . . the sound lab. This room is ultra-quiet, but large enough to handle 400 ton transformers for testing. These sound tests assure that the units will operate as silently as possible.

Foul ball — but why duck?

Ever sit back of home plate at the local ball park and find yourself ducking when a hot foul tip came your way, only to be stopped by the protecting screen? Though the reaction usually is unnecessary, fans in Toronto in past seasons have had good reason to duck. Every time a foul hit the screen, a shower of rust flakes from the metal descended upon them. Not so this season. The old screen has been replaced by rust-proof aluminum wire fencing. (Kaiser Aluminum *News*)

chemical processing

(CHEMICAL PROCESSING PREVIEW)

for men who manage

Vol. 17 December, 1954 No. 12

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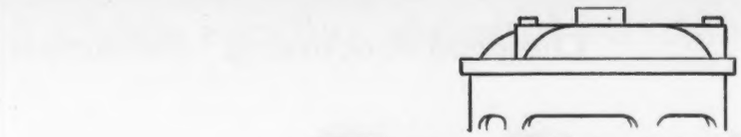
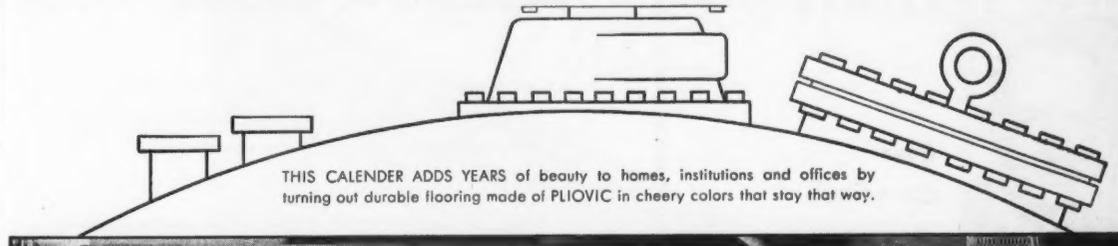
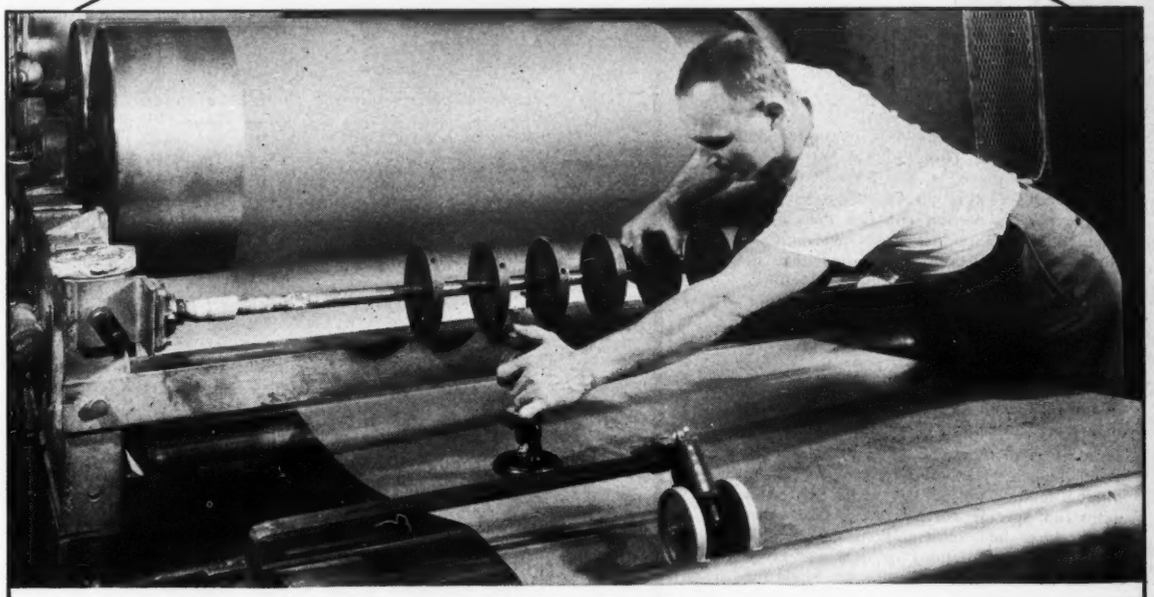


The Flooring

that's made by the mile to wear miles longer



THIS CALENDER ADDS YEARS of beauty to homes, institutions and offices by turning out durable flooring made of PLIOVIC in cheery colors that stay that way.



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Over the editor's shoulder

Combating Corrosion . . . Houston to Marcus Hook

Plant visits in such widely separated localities as Houston, Texas and Marcus Hook, Pennsylvania played a big role in shaping this month's feature on Corrosion Control. This expanded section contains factual reports on how specific plants are fighting corrosion, in practice, using ideas that no doubt could be applied to your problems.

See how Sinclair uses aluminum tube bundles in battling corrosion, on page 52, how General American Transportation saves its Terminal storage tanks by cathodic protection, page 62; how hot hydrochloric acid is moved economically through plastic pipe, in another "case history" on page 68.

In addition to these and other plant reports, you'll find a series of "corrosion keys", a unique method of finding which materials withstand specific corrosives . . . at what temperatures and concentrations (page 88). Other handy tabulations of data are given to help you select construction materials for corrosive conditions.

Latest developments on titanium, tantalum, zirconium, protective coatings, process controls, corrosion-resistant equipment, and inhibitors are other topics highlighted in the corrosion control feature.

Our entire staff has worked hard in digging out information on these most-recent advances in combating corrosion. We owe a debt of gratitude to the men who provided us with authoritative technical papers dealing with certain aspects of corrosion; and to the companies who furnished us with the information on important developments.

Gordon Weyermuller

ASSOCIATE EDITOR

THIS MONTH'S COVER

Story of the successful fight against tube bundle corrosion at Sinclair's Marcus Hook refinery (pictured in a dramatic night scene) starts on page 52, is one of many installation features in 52 pages of corrosion problems, solutions and ideas highlighting this issue.

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1. When you want more information on processes, controls or developments of products discussed in this issue, see Reader Service slip opposite page 2

2. If you are looking for information on specific products, use the Product Directory "Quicklocator" for all types of materials, instruments, processing equipment, etc. This Product Directory lists everything in this issue, with page references 199

3. If you want to subscribe to this magazine, see reader-qualification form opposite page 3

Corrosion Feature — new editorial coverage

In this issue you will find the first of a series of "features". The feature this month is devoted to Corrosion Control. (Page 51.)

These features will be carried a number of times during the year and will present expanded data in a specific section of the publication.

In Corrosion Control this month you will find a guest editorial by Dr. Aaron Wachter, President of National Association of Corrosion Engineers, and associated with Shell Development Company, Emeryville, California.

In addition, a series of condensations from talks presented before the National Association of Corrosion Engineers is included. Other editorial coverage includes performance stories and new developments.

Also in the Corrosion Control feature are data sheets giving you information on corrosion resistance of various types of materials. You will see a new method of showing corrosion resistance of various types of materials to a number of chemicals. These have been prepared in simple, easy-to understand style to act as a guide for your design problems.

Since announcing the Corrosion Control feature, there has been widespread interest in this basic idea. From this interest is indicated a need for highlighting other sections of the publication from time to time, and you can look forward to seeing other features in 1955. These will not be presented at a sacrifice to our other editorial coverage, and we'll always maintain a good balance of our regular material.

The March issue of CHEMICAL PROCESSING will contain a feature devoted to chemical materials. Plans have been drawn now for a concise presentation of all new chemical materials introduced in the year 1954.

John C. Vaaler

Editor

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Produced by *specialists* in "essential chemicals from hydrocarbon sources."

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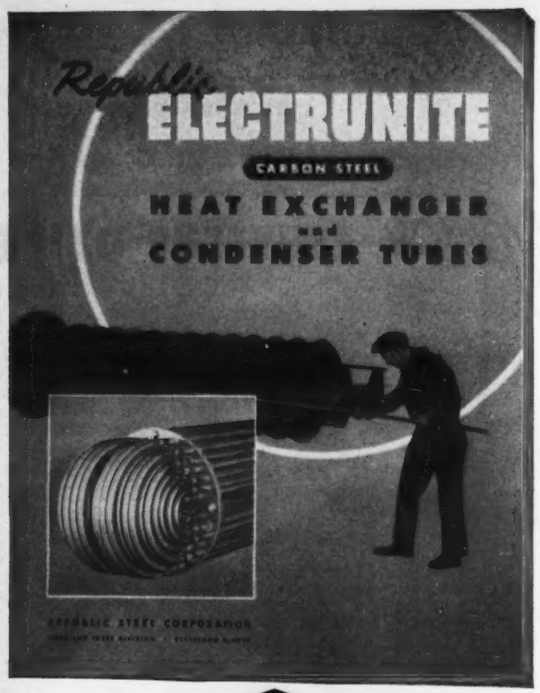

IF YOU USE HEAT EXCHANGERS YOU NEED THIS NEW BOOKLET

This is Republic's new booklet on Specification A.S.T.M. A-214, written and adopted covering electric resistance-welded steel tubes for Heat Exchangers and Condensers.

You'll find information on tests, specification points to consider when purchasing or specifying tubing, and how ELECTRUNITE Tubing conforms to all conditions and requirements.

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what you can expect in next month's issue . . .

Here's a quick preview of features you'll find in January's Chemical Processing

Economical handling of styrene powder

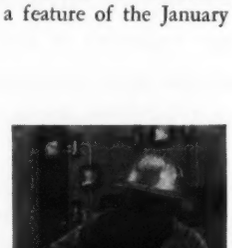
Pictured at right is a Hinde & Dauch 1000-pound container used by Bernard Edward Co., of Chicago to handle styrene powder shipments from Monsanto. The container, being inspected by Assistant Editor Roy Helsing (right), has provided savings in handling costs and storage space. Complete story is the Packaging feature next month.

Mill dries, pulverizes, classifies material simultaneously

Rubarite, Inc., needed a system which would handle its delicate process for making asphalt-rubberizing material. In equipping its new Arkansas plant, Rubarite selected a mill which automatically and simultaneously carries out the three major steps of the operation — drying, pulverizing, classifying — while maintaining the required quality.

Story of the process and the mill is told by Rubarite General Manager Walter F. Winters and Assistant Editor Ted F. Meinhold as a feature of the January "New Solutions" section.

Electronic control in action



Art Aldous, instrument foreman at Rock Island's Indianapolis oil refinery, is shown here calibrating one of the electronic recorders used in the control system of a UOP Platforming unit. Total calibration time, incidentally, was ten minutes. This and other unusual aspects of electronic control are pointed out in next month's Instrument feature story which was developed by Aldous and Associate Editor Bruce Fader.

Bergstrom Paper removes sludge from de-inking wastes

Sludge in de-inking wastes at the Bergstrom Paper Co., Neenah, Wis., formerly gave the city sewage department plenty of headaches. The plant's sludge had to be treated specially, since it is non-combustible and the city customarily burned its sludge.

This "New Solutions" highlight tells how Bergstrom solved the city's problem by setting up its own filter system. Managing Editor Dana Berg visited the plant, worked with Mill Superintendent R. M. Elias on the story.

Make sure it stinks!

So that housewives can tell when they've left an unlit gasburner on, pipeline companies add organic sulfur compounds to "odorless" natural gas to produce the gassy smell.

Putting the "stink" into gas involved matching odorant rate to a widely swinging gas rate without too big a safety margin of expensive odorant. Working with Assistant Superintendent H. L. Cline of Transcontinental Gas Pipe Line Corp., Associate Editor Bruce Fader reports on how to odorize gas the up-to-date way in "Ideas" for January.

And in brief . . .

A chemical method of tower cleaning cuts five weeks off the time usually required for that job at Sohio Refineries. Story is an Engineering and Maintenance feature next month . . . "Materials" highlight tells possibilities of high molecular weight naphthenic acids, which offer some interesting properties . . . January's "Guest" editor, James I. Harper, Ass't. Director of Research & Development at Sun Oil, reports on petrochemicals — what they are, how they're used, and where they're going . . . many other stories give up-to-date information on chemical and allied industries.

Dec. 2-7. American Society of Mechanical Engineers, 21st National Exposition of Power and Mechanical Engineering, Commercial Museum, Philadelphia, Pennsylvania.

Dec. 7-8. The Society of the Plastics Industry, Inc., Division Conference on Sheeting and Coated Fabrics, Hotel Commodore, New York City.

Dec. 12-15. American Institute of Chemical Engineers, Annual meeting, Statler Hotel, New York City.

Jan. 12-15. World Symposium on Applied Solar Energy, sponsored by Stanford Research Institute, Westward Ho Hotel, Phoenix, Arizona.

Jan. 24-26. Plant Maintenance and Engineering Conference, International Amphitheatre, Chicago, Illinois.

Jan. 24-28. 12th International Heating and Ventilating Exposition, with 61st Annual Meeting of the American Society of Heating and Ventilating Engineers, Commercial Museum and Convention Hall, Philadelphia, Pa.

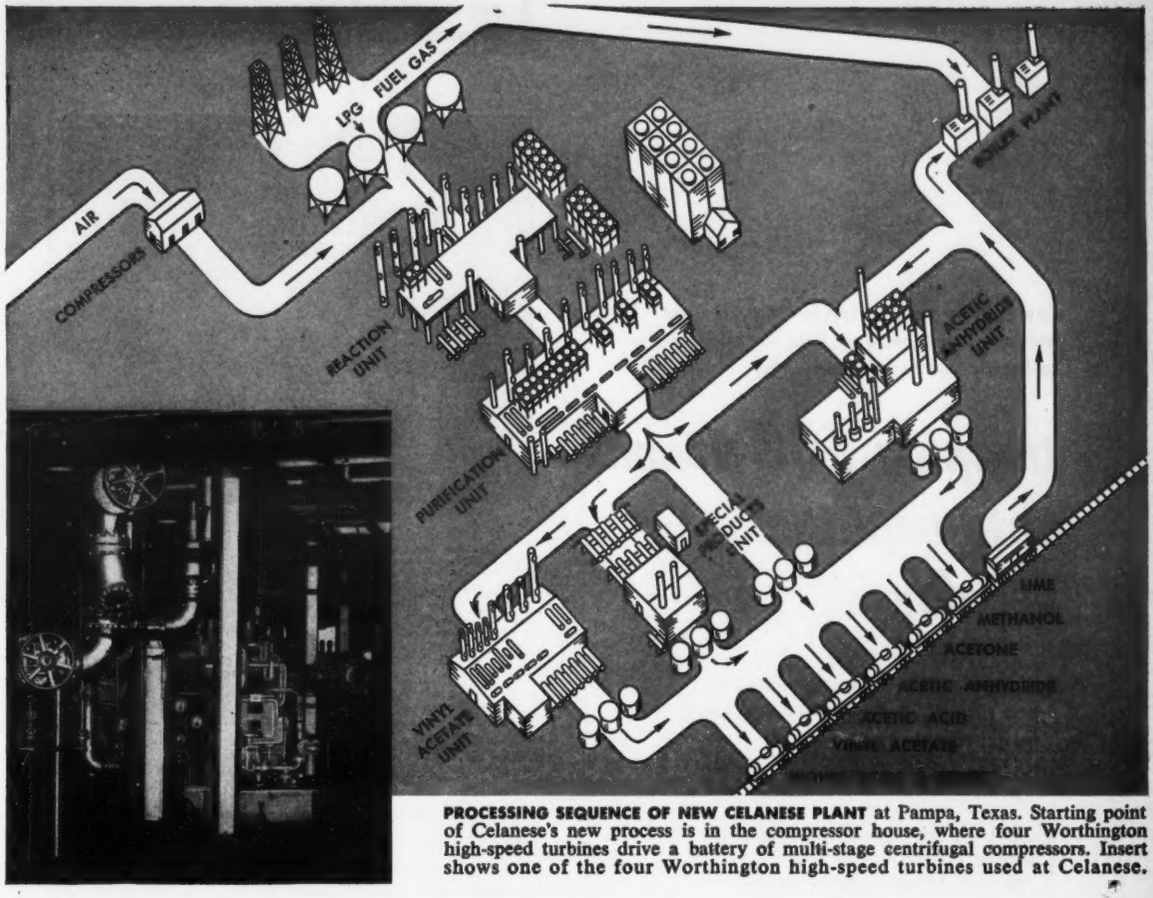
Jan. 26-28. Symposium on Instrumentation for the Process Industries, Agricultural and Mechanical College of Texas, College Station, Texas.

Jan. 27-28. American Chemical Society, Southeastern Texas Section, Symposium on Hydrocarbon Chemistry, Rice Hotel, Houston, Texas.

Feb. 8-10. The Society of the Plastics Industry, Inc., 10th Annual Reinforced Plastics Division Conference, Hotel Statler, Los Angeles, California.

CAN YOU WRITE . . .?

There is an opportunity in editorial work for a man who has an engineering or chemical background, some plant experience, a desire to travel and meet people . . . and some writing talent. If you're interested write: The Editor, CHEMICAL PROCESSING, 111 E. Delaware Place, Chicago 11, Ill. State experience and desired salary.



PROCESSING SEQUENCE OF NEW CELANESE PLANT at Pampa, Texas. Starting point of Celanese's new process is in the compressor house, where four Worthington high-speed turbines drive a battery of multi-stage centrifugal compressors. Insert shows one of the four Worthington high-speed turbines used at Celanese.

Four high-speed Worthington turbines drive compressors in new Celanese plant

In May, 1953, Celanese Corporation of America opened their new petro-chemical plant near Pampa, Texas, in the heart of the Panhandle.

By employing a new air-oxidation process, the Pampa plant will produce 1,800,000 lbs. of glacial acetic acid weekly, with 95% normal butane used as a charging stock.

Celanese selected four high-speed Worthington steam turbines to drive the centrifugal compressors used to compress air at the start of the oxidation process. The speeds of the turbines were determined by the nature of the process itself: two of the units are rated 3070 hp at 10,000 rpm, and two are rated 5000 hp at 7500 rpm. The control problem created by this arrangement was solved by using Worthington Woodward governors with built-in air motors. The four turbine-compressor units are synchronized automatically by instrumentation in the control room.

There's a good reason why Celanese — and so many other leading industrial names — choose Worthington high-speed turbines for compressor and blower drives. They know that Worthington's long experience in compressor-drive engineering assures them of getting exactly the *right* type and size drive for their needs.

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Expanding production increased dust nuisance and product loss, but bag collector "saves the day" by

trapping 500 pounds beta-naphthol per day

Collecting efficiency estimated to be more than 95% on 6000-cfm unit hooked to chip cooler

DR. E. G. YEE, Chemical Engineer, Sherwin-Williams Company
TED F. MEINHOLD, Assistant Editor

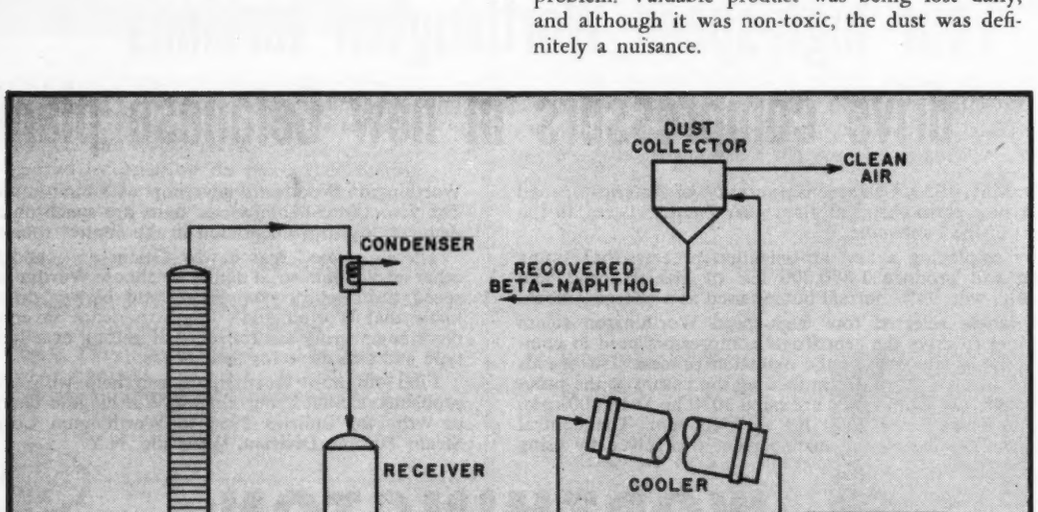
Roto-Louvre cooler handles 3000 pounds chipped product per hour. Slanting duct in foreground feeds material from chipper (at right) into cooler. Large vertical duct in background carries dust to collector. Slanting duct (upper left) returns reclaimed product to drums. Vertical column in right foreground houses conveyor, which transfers chips from chipper to cooler's feed duct

Dust collector recovers about 500 pounds of valuable beta-naphthol per day. Curved pipe at right is outlet, straight pipe is inlet

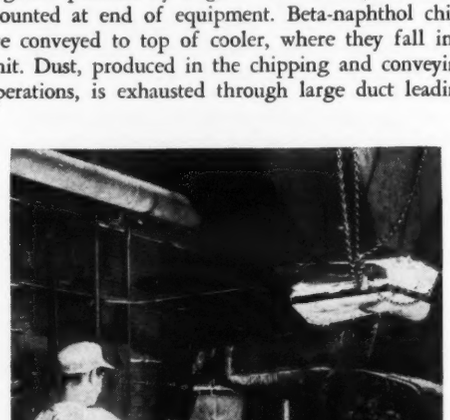
Problem: When Sherwin-Williams was drawing up plans for expanding its beta-naphthol production at the Chicago plant, engineers knew that their old dust collector would not be able to handle the additional load. Dust control was already a big problem. Valuable product was being lost daily, and although it was non-toxic, the dust was definitely a nuisance.

Practically all the dust emanated from the cooler, where chipped beta-naphthol is cooled to about 100°F prior to bagging. Product is used in making dyes, antioxidants, and color intermediates.

Solution: When the new 300-lb-per-hr Link-Belt Roto-Louvre cooler arrived, a Wheelabrator Dustube collector was installed right along with it. Cooler, about 6 ft diameter x 14 ft long, is kept under negative pressure by large exhaust fan (6000 cfm) mounted at end of equipment. Beta-naphthol chips are conveyed to top of cooler, where they fall into unit. Dust, produced in the chipping and conveying operations, is exhausted through large duct leading



Simplified flow sheet shows how beta-naphthol is processed at Sherwin-Williams Company, Chicago, Illinois



Finished product is packed in 80-pound bags

to collector installed on roof of the plant.

In the collector, heavier particles of incoming dust-laden air drop immediately into hopper due to impingement upon baffle plates and sudden reduction in air velocity. Air then flows upward into tubes where it is filtered through ample fabric area. Accumulated dust is precipitated into hopper by combined horizontal and vertical movement imparted by shaker mechanism. Recovered beta-naphthol is returned to plant through large duct. Reclaimed material can be bagged and sold just like the rest, although sometimes it is returned to stills and reprocessed.

Results: In a typical day's production about 500 pounds of dust per day are caught in the collector and reclaimed. Collecting efficiency is estimated to be higher than 95%. Dust nuisance problem has been entirely eliminated. Collector has been in operation four years and has been cleaned only once.

(Dustube collectors are product of American Wheelabrator and Equipment Corporation, Dept. CP, 912 Byrkit Street, Mishawaka, Indiana . . . or for more information check CP 3900 on handy form, pages 2 and 3.)

Impregnation stops leaks in drying drum . . .

also provides protection against corrosion

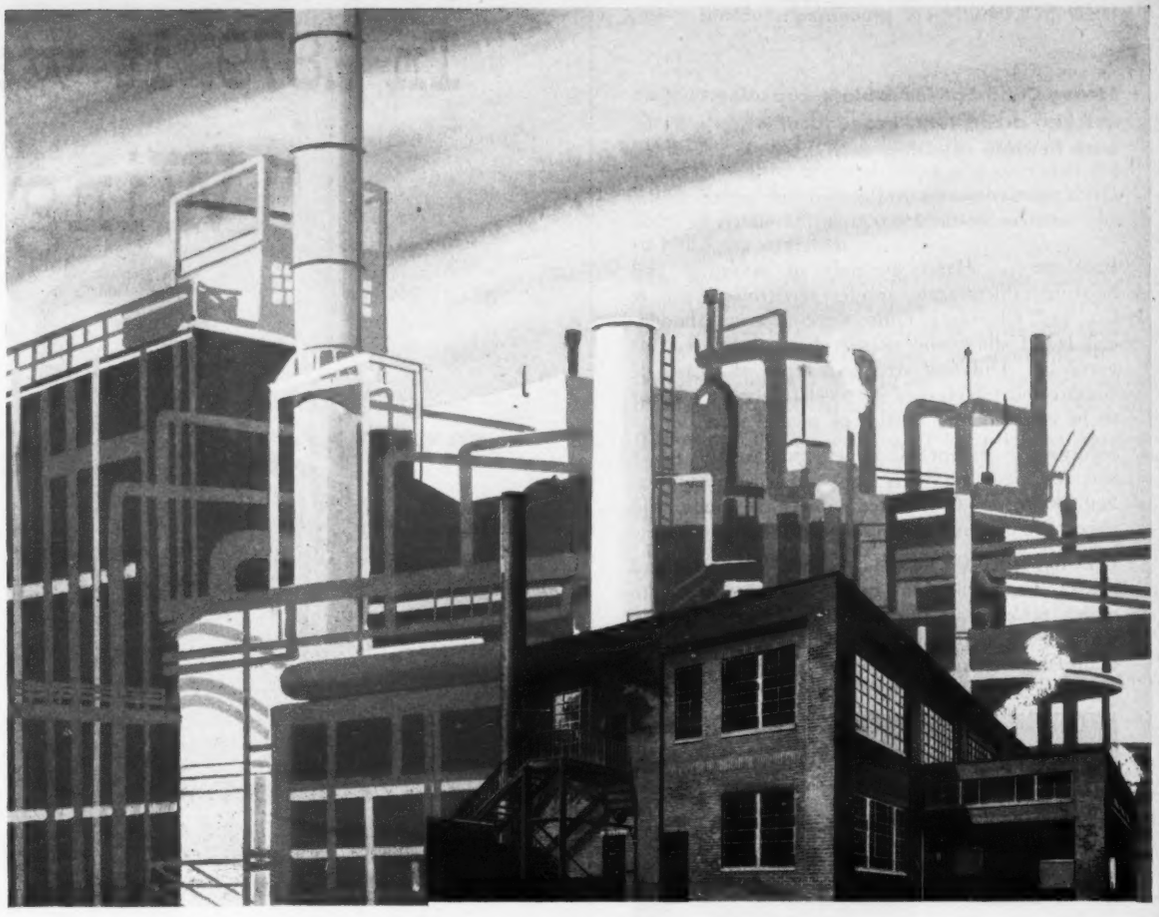
Problem: Leaky drying drum was threatening to interfere with production at Stevens-Thompson Paper Company, Greenwich, N. Y. Examination showed that machine had been brazed on inside to secure plate that holds journal to inside of the 6′ diam, 7-ton drum. Leaks occurred in area around journal.

Solution: Engineers decided to stop the leaks by impregnating the drum with a sealing solution. Using steam pressure, the exact locations of all leaks were first found. Vacuum was then pulled on unit and impregnant drawn in. Steam was again applied to force impregnant through the openings.

After all leaks were sealed, remaining solution was removed. Drum was washed, steamed, dried, and repressurized with steam to see if all leaks had been sealed.

Results: No leaks were found and machine was turned over to production for operation. There was no interference with production because job was handled during plant shutdown. By filling up all microscopic pores, impregnant also provides protection against corrosion.

(Metaseal process is development of American Metaseal Manufacturing Corporation, Dept. CP, 607 65th St., West New York, N. J. . . . or for more information check CP 3901 on handy form, pages 2 and 3.)



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The BIRD RESEARCH and DEVELOPMENT CENTER

Your test and pilot plant for FILTRATION

When inquiring check CP 3902 on handy form, pgs. 2-3

Strong Cobb bottles tablets, capsules quickly, accurately, economically with flexible counting unit . . .

fast, easy change-over makes short runs feasible; unit can bottle 250,000 coated tablets/hr

Problem: Hand methods of counting and bottling tablets and capsules at Strong Cobb & Co., Inc., Cleveland, Ohio, were slow, uneconomical. Hand slides and plastic discs were used for versatility. Different sizes and types of coated or compressed tablets and soft gelatine capsules had to be counted into bottles of several sizes.

Solution: Count-All tablet counter No. 84-16 was installed two years ago. Capacity of unit is 200,000 to 250,000 coated tablets per hour, and about 120,000 uncoated tablets per hour.

Unit has space for 84 slats — both "counters" and blanks. The blank slats (having no depressions into which tablets can fall) separate groups of slats which have depressions (see photographs). One blank slat having a lug on the back side is placed

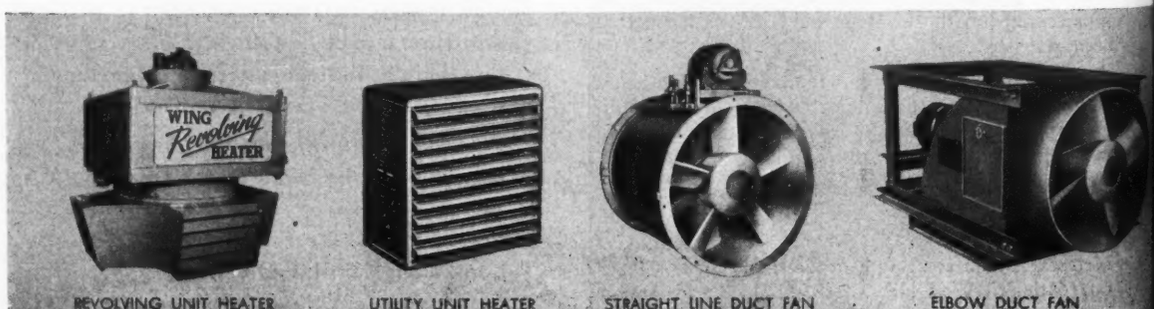
Placed in hopper, tablets fall into holes in "counter" slats and are moved up and over to . . .

in each separator group. Lug automatically trips mechanism, stopping unit while operator renews bottles. Operator starts machine by hand. Versatility is maintained by the ease with which change-over can be accomplished, as shown below.

. . . manifold, where they fall through throat, filling eight 1¼ oz Blake bottles with 100 tablets each

In 1879, it was the new "Wing's Disc Fan"

It was 75 years ago that L. J. Wing, an ingenious Yankee who had come to New York with some ideas about mechanical devices, formed the company which later became the L. J. Wing Mfg. Co., for the purpose of manufacturing and selling "Wing's Disc Fan" which, according to his catalog, would "move more air than any other Fan made for heating, ventilation, drying, etc., as competitive trials have shown". Today, Wing products for ventilation, heating and combustion are known for their efficiency and dependability in all parts of the world. The company Mr. Wing founded has kept his ideals of originality and excellence constantly before them.



Slats can be replaced to match tablet size and shape. If different bottle size is required, changing manifold and throat (shown in accompanying picture) to give required count and to match the bottle being filled is all that's necessary. Extra holes in "counter" slats can be covered with tape to eliminate overcounts.

Results: Count is very accurate. Unit operates economically and requires little maintenance. Strong Cobb has found it so extremely versatile that they set it up, if it's available, even for short runs of, say, 1000 bottles. On these runs, change-over can be made in 20 to 30 minutes.

(Counting unit is a product of Merrill Machinery Sales Co., Dept. CP, 111 W. Jackson Blvd., Chicago 4, Ill. Check CP 3904, pages 2 and 3.)

Plant reduces maintenance costs, improves appearance with inert plastic ductwork . . .

strong and lightweight, material can be sawed, shaped, sanded, or drilled

Problem: Ventilating ducts had to be replaced periodically at The Cleveland Graphite Bronze Company, Cleveland, Ohio, because acid fumes were eating them away. The coated metal ducts were exhausting muriatic acid fumes from plating tanks.

Solution: Ducts were replaced by those made out of "Seilon" — a rigid, polyvinyl chloride. Strong and chemically inert, the lightweight material can be sawed, shaped, sanded, or drilled. Sheets can

Ductwork exhausts muriatic acid fumes

be welded by a "hot gas" welding method which joins them together in any variety of sizes. Tubes, pipes, rods, and bars can be produced by extrusion.

Results: Installed in 1951, ducting has needed no maintenance of any consequence. Officials state that plant's appearance has been improved too, because unsightly rust spots formerly present on metal ducts have been eliminated.

(Seilon is product of Seiberling Rubber Company, Dept. CP, Akron, Ohio . . . or for more information check CP 3905 on handy form, pages 2 and 3.)

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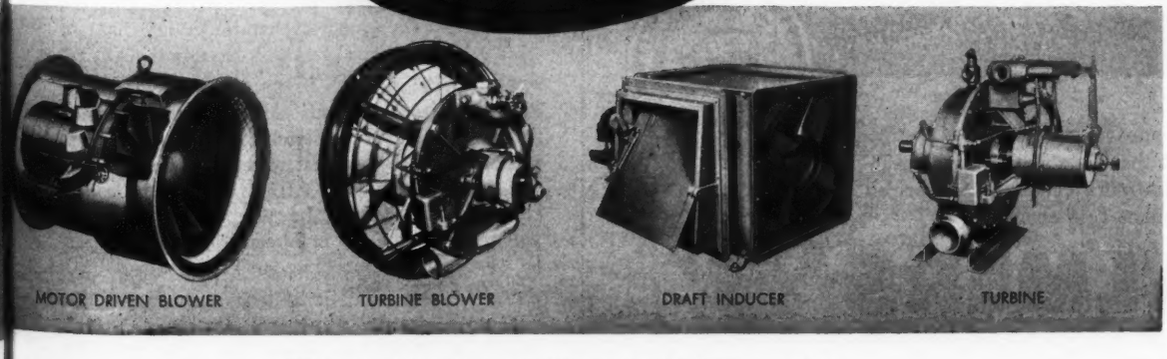

MOTOR DRIVEN BLOWER TURBINE BLOWER DRAFT INDUCER TURBINE

When inquiring check CP 3903 on handy form, pgs. 2-3

It takes Six Bolts –

not just four

to give full bearing protection for greater motor performance

THE TWO EXTRA BOLTS in the end housing of every Allis-Chalmers ball bearing motor are the proof of *extra* protection against bearing failure. These are the bolts that hold the bearing cap tightly in place against the inner face of the bearing enclosure. This cap, with its close running clearances, keeps grease from the interior of the motor . . . retains an ample supply within the bearing enclosure . . . protects the grease and the bearing against contamination from dirt and moisture.

At the outer side of the bearing, double labyrinth seals keep grease in, also keep dirt out. What's more, large grease reservoirs act as additional dirt traps.

Result? Allis-Chalmers motors pay off in longer, trouble-free bearing life, lower motor maintenance.

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ALLIS-CHALMERS

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A-4444

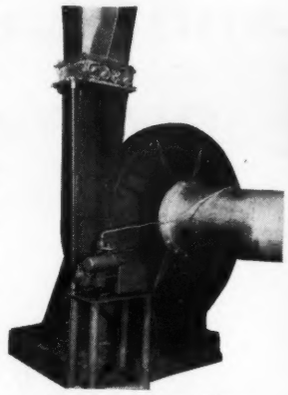
When inquiring check CP 3906 on handy form, pgs. 2-3

Five years handling corrosive gases hasn't hurt pressure blowers used in CO_2 process

Problem: Positive blowers used at the Cincinnati plant of Liquid Carbonic Corporation for handling flue gas failed in six months to two years. Each blower that failed caused a financial loss of $2000 to $7000, depending on size. Company was spending about $20,000 per year for replacement and maintenance in a similar plant.

The flue gas, obtained from burning fuel oil, is used to produce pure CO_2 for manufacturing dry ice. In process, power and steam are generated for plant. Since fuel oil contains a high sulfur content, it produces a very corrosive gas, which contains SO_2, SO_3, NO_2, and is saturated with water vapor. When this flue gas was handled at 100°F, it corroded blowers' cast iron shell.

Solution: Pressure blowers were installed which are fabricated of materials specifically suited to resist the corrosives encountered. Of 20 metals tested, Hastelloy C and 316 stainless steel were found to be the best for this application. Fan wheel and shaft were manufactured of 316 stainless and outlet damper of Hastelloy C. Housing interior was coated with 3/16″ of sprayed neoprene.



Corrosion resistant blower in operation at the Cincinnati plant of Liquid Carbonic Corp.

Care was taken in welding to avoid corrosion at the seams. Hastelloy rod was found to be most desirable for welding Hastelloy parts to 316 stainless, while 347 rod was used for welding 316 together. Fans are fabricated of heavy gage steel plate for the heavy duty service. They weigh 2200 lb apiece. Stresses were overcome by proper design.

Blowers are designed to handle either 5000 or 10,000 cfm of flue gas and to maintain a 32″ static pressure at 1725 rpm or 35″ at 1850 rpm.

Results: After five years of service, fans haven't been touched by the corrosive gases, according to the Manager of Manufacturing and Engineering, Compressed Gas Div. After the fans in use at Cincinnati proved to be successful, similar installations were made in Liquid Carbonic plants in St. Louis, Los Angeles, and San Francisco.

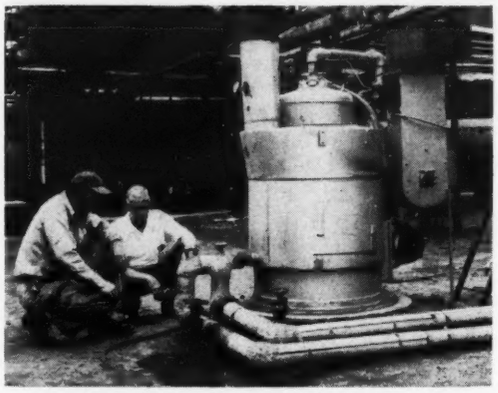
(Blowers are product of General Blower Co., Dept. CP, Morton Grove, Ill. . . . or for more information check CP 3907 on handy form, pages 2 and 3.)

Refinery still output upped 16% by compact oil heater . . .

transfers 760,000 Btu per hour, is only little larger than a home refrigerator

Output of fractionating tower at Oriental Refining Company, Denver, Colorado, has been increased 16% by use of compact heater. Handling 900 gallons of crude oil per hour, heater raises temperature of oil from 630°F to 780°F — releasing 760,000 Btu per hour. Oil is drawn off bottom of tower, pumped through heater's steel coils, and returned to distillation unit. Doing this has increased hourly output of tower by ten barrels in normal operation.

Only little larger than a home refrigerator, heater uses non-condensible gas from thermal cracking unit for fuel. Gas has 1500 Btu content and is piped to burner at 3 to 6-oz pressure. Intensity of



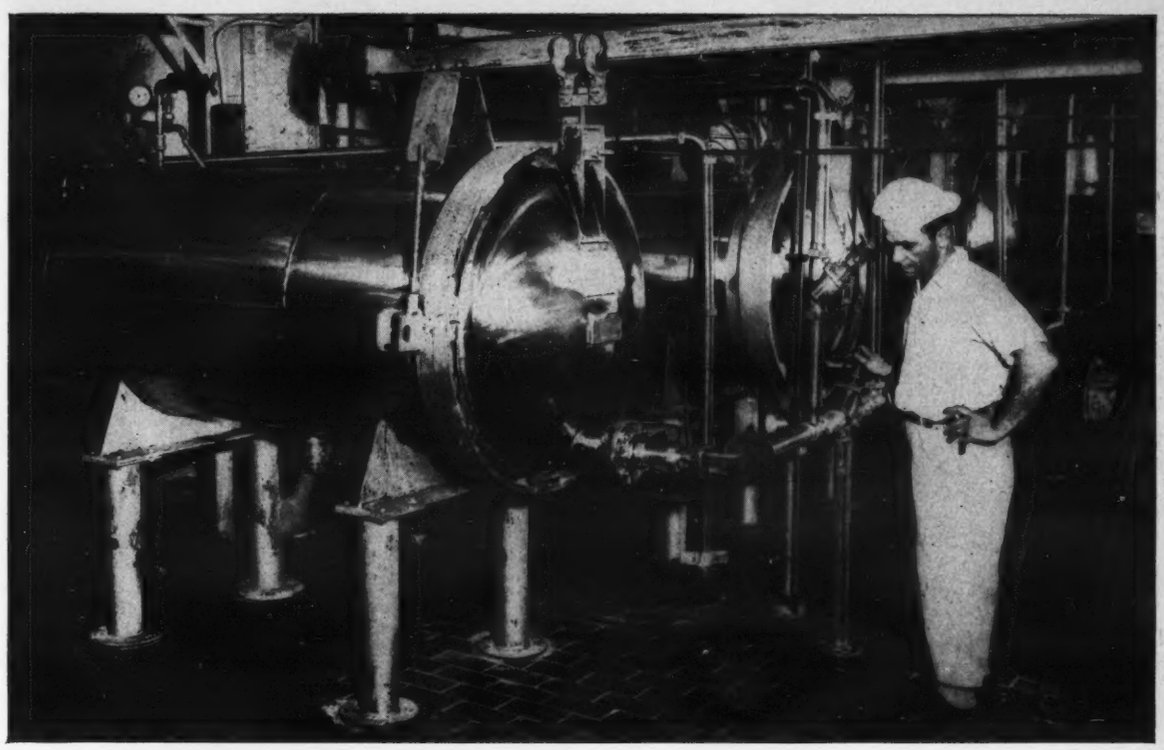
Compact heater has increased hourly output of refinery distillation unit by 10 barrels at the Oriental Refining Company

forced draft fire is manually controlled by operator. Stack temperature runs about 100 degrees above oil temperature — indicating high efficiency.

Operation is simple — one switch turns on electric motor driving blower, transformer supplies spark for gas pilot light, and electric solenoid valve shuts off fire in case of electrical failure.

Currently being used only to reheat reduced crude, heater may in the future be used for reheating cracked residue for further refining, and for heating tank bottoms prior to cleaning. New pumps on order should increase heat release to one million Btu per hour. Manufacturer is working on unit that will release 3 million Btu.

(Heaters described above are product of Vapor Heating Corporation, Department CP, 6420 West Howard Street, Chicago 31, Illinois . . . or for more information concerning the manufacturer's product, reader may simply check CP 3908 on the convenient Reader Service slip which is located between pages two and three.)



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Niagara Filters, both horizontal and vertical, are available in a wide range of capacities and can be made of stainless steel or other alloys for corrosion resistance. And Niagara users are served by filtration specialists located in 27 cities from coast to coast.

Want details? Just clip and mail the coupon.

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They've had years of experience. They'll study and analyze your filtration problems . . . test your samples . . . pilot the filtration . . . and build a Niagara unit to meet your most exacting requirements.

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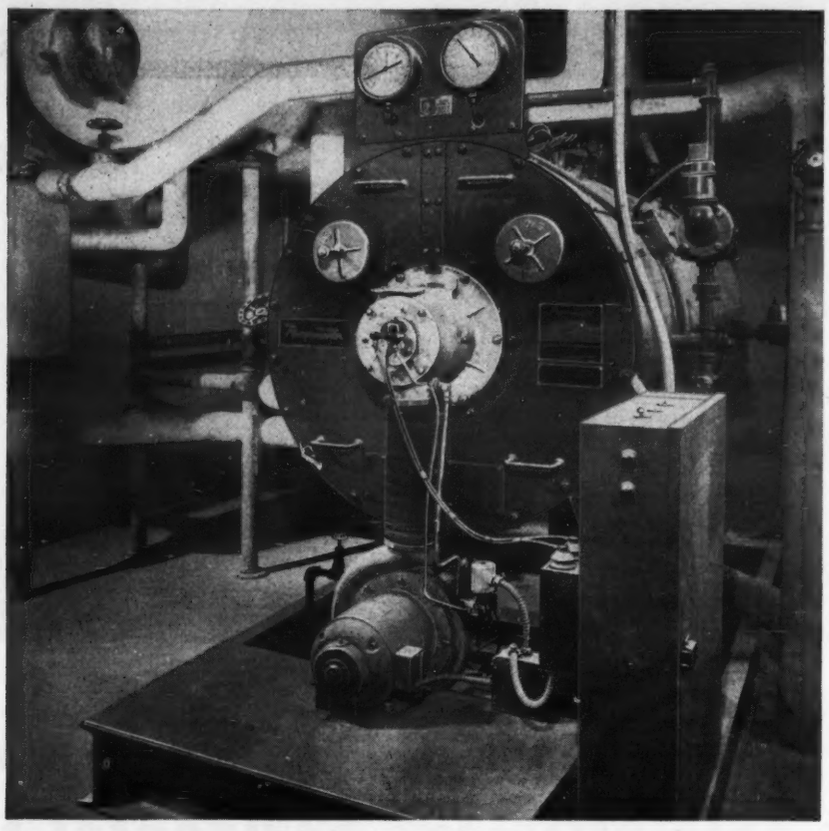
When inquiring check CP 3909 on handy form, pgs. 2-3

in CHEMICAL INDUSTRIES



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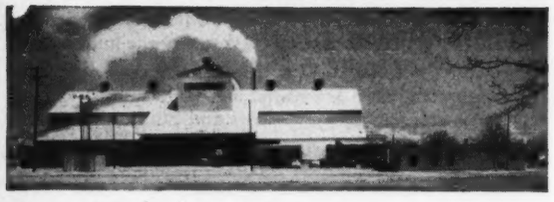

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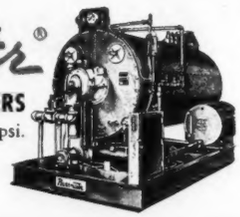
sizes to 500 HP; Pressures to 250 psi.



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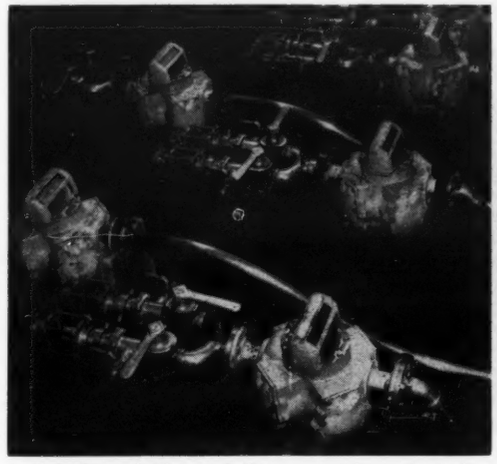
When inquiring check CP 3910 on handy form, pgs. 2-3

NEW SOLUTIONS of processing problems

Beer meters averaged 2 months between repair jobs — now run years

Problem: Beer is clean and non-corrosive by chemical plant standards. Metering its flow should be a cinch. But close Government scrutiny of alcohol tax reports requires long-term accuracy. Meters in beer service are checked every month and taken out of service if they cannot be adjusted within legal limits. On this account, Jacob Ruppert Brewery in New York (with 15 such meters) faced a continual maintenance chore. Some of the meters went to the instrument shop every two months.

Solution: About four years ago Ruppert switched to a simpler meter construction. Accuracy requirement is met by use of a positive piston displacement meter. Design, however, requires a total of only eight moving parts. An important design feature is the fact that pistons are equipped with expanding carbon rings. There is no metal to metal contact — beer acts as the seal and lubricant.



Only four of fifteen of these meters have required service in four years of continuous operation

This design permits fast, easy cleaning. Entire meter can be flushed out by forcing cleaning solution into the discharge side of meter. This backwashing does not reverse counter reading. (In some cases this back pressure was applied too quickly and resulted in need for repair work.)

Petcock outlet at underside of meter body permits complete draining. Cylinders and valve chambers are large enough for scrubbing by hand when required. For this service they were designed with reading registers in barrels of 31 US gallons.

Results: Fifteen of these meters have been operating 24 hours a day, seven days a week for four years. Only four have needed maintenance jobs.

(Beer meters are built by Rockwell Mfg. Co., Dept. CP, 400 N. Lexington Ave., Pittsburgh 8, Pa. . . . check CP 3911, pages 2 and 3.)

Why it pays to specify *The Leading Brand*

YOU SAVE three important ways when you specify TUBE-TURN Welding Fitting and Flanges. (1) You get the most advanced products available . . . assured by Tube Turns' pioneering research. (2) You get the exact fitting and flange for *your* problem promptly because Tube Turns has the world's most complete line . . . available nearby. (3) You get piping ideas through the outstanding Engineering Service and how-to-do-it information of Tube Turns.

These money-saving extras are yours when you specify "TUBE-TURN". Call your nearby Tube Turns' Distributor.

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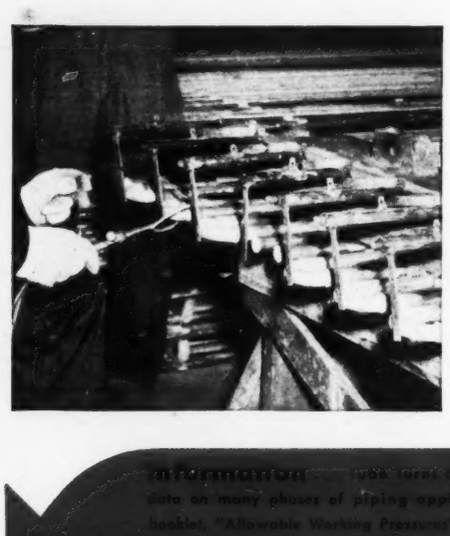
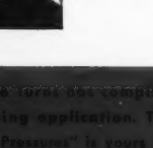
A LARGE PROCESSOR had a problem of retubing seven large cooling units, formerly fabricated from copper tubing and fittings. Thin-walled aluminum was considered as a replacement; however, there were no satisfactory methods for fabricating the metal.

Tube Turns' Engineering Service Division, working with Alcoa, came up with the solution. Special TUBE-TURN Elbows and a new brazing technique were developed and the problem was solved. Total saving by customer was $50,000. This engineering service is one of the extras you get when you do business with the leader . . . Tube Turns.



THE JOB. Brazing TUBE-TURN Aluminum Returns to aluminum tubing for cooling coils.

INFORMATION . . . Tube Turns has compiled data on many phases of piping application. This booklet, "Allowable Working Pressures" is yours for the asking. Just mail the coupon.



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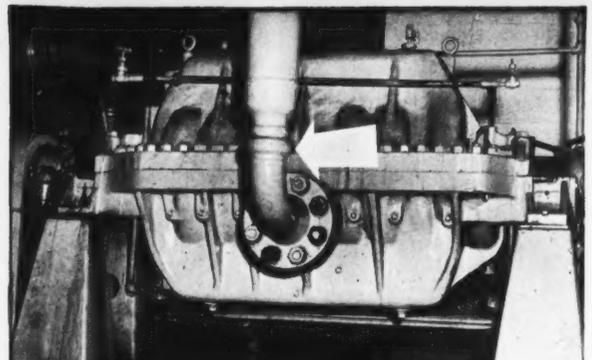
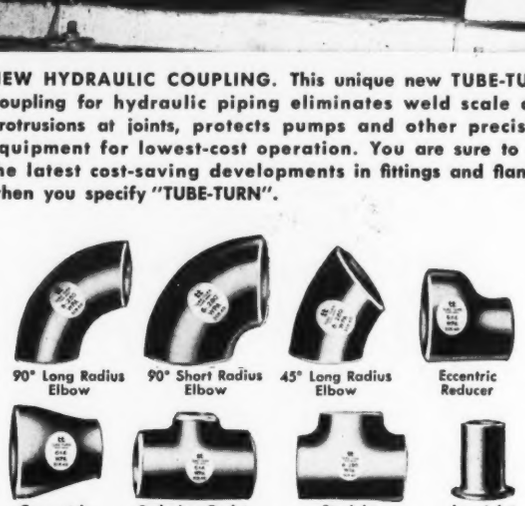
Position _____



NEW HYDRAULIC COUPLING. This unique new TUBE-TURN Coupling for hydraulic piping eliminates weld scale and protrusions at joints, protects pumps and other precision equipment for lowest-cost operation. You are sure to get the latest cost-saving developments in fittings and flanges when you specify "TUBE-TURN".



YOU GET COMPLETE SERVICE. Your nearby Tube Turns' Distributor gives you the *exact* answer to your specific piping problem from the world's most complete line of welding fittings and flanges. It includes more than 4000 items . . . in all piping materials, schedules and sizes. This service is backed up by Tube Turns' engineering assistance.

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TUBE TURNS
LOUISVILLE 1, KENTUCKY
A DIVISION OF NATIONAL CYLINDER GAS COMPANY

Special packaging required — portable bag-stitcher does job . . .

lightweight unit has stitch range of 4 to 5½ per inch

Problem: When one customer wanted his order of sun-proofing agent packed in bags instead of the regular cartons, Witco Chemical Company naturally wanted to oblige. However, to bring a bag-stitching machine over from another building was impractical. Not only would it interfere with the other operations, but it would be a laborious job, too.

Portable bag closer weighs only 10½ lb

The purchase of a large permanent bag-stitching machine wasn't justifiable either, because the company worked on the order only one or two days a week.

The compounded material is used in rubber making and prevents sunchecking.

Solution: Company invested in a small, lightweight, portable bag-closer to handle the order. Simple to use, entire unit weighs only 10½ lb and operates from any cycle 110 AC or DC line. Machine can handle all kinds of textile and paper bags. Stitch range is from 4 to 5½ stitches per inch.

Optional suspension unit was also installed with bag-closer. Consisting of a suspended counterweight attached to stitcher, operator can pull machine down to necessary level, and push it out of the way when sewing job is done. Bag-closer can be easily lifted off engaging rod for use elsewhere.

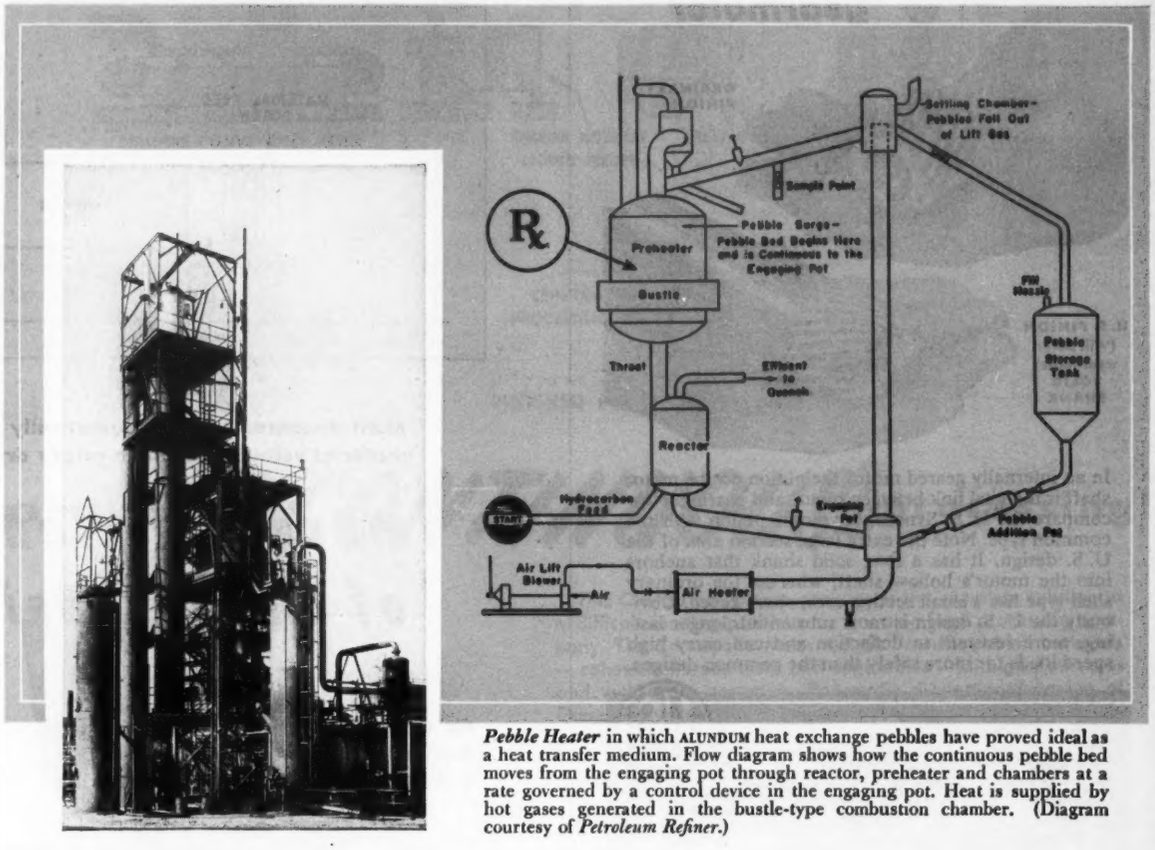
Results: One man handles entire job. Unit does all the work — operator has only to guide it. An average 100-lb bag can be closed in less than 6 seconds.

(Portable bag-closer is product of Dave Fischbein Company, Dept. CP, 38 Glenwood Avenue, Minneapolis 3, Minn. . . . or for more information reader may simply check CP 3912 on the convenient Reader Service slip which is located between pages two and three.)

For more information on product at left, specify CP 3913 . . . see information request blank between pages 2 and 3.

Rx for cost-saving efficiency

in high temperature processing . . .



Pebble Heater in which ALUNDUM heat exchange pebbles have proved ideal as a heat transfer medium. Flow diagram shows how the continuous pebble bed moves from the engaging pot through reactor, preheater and chambers at a rate governed by a control device in the engaging pot. Heat is supplied by hot gases generated in the bustle-type combustion chamber. (Diagram courtesy of *Petroleum Refiner*.)

Pebble heaters with ALUNDUM* pebbles

Pebble heaters are now available which are capable of heating gases above operating temperatures permissible in conventional tube furnaces. Low initial cost, high operating efficiency and the use of low cost gas or oil fuel are attracting favorable attention to these heaters for high temperature processing.

For the production of ethylene, for example, the Phillips Petroleum Company has installed a 30 Mm Btu per hour commercial pebble heater at Borger, Texas, following several years of successful pilot plant operation.

In this installation, Norton ALUNDUM heat exchange pebbles have given excellent results. ALUNDUM pebbles, *engineered* to stand up under abrasion, impact and repeated heating and cooling, are *prescribed* as the ideal heat transfer medium for pebble heaters. Also, their high refractoriness, which prevents softening or incipient fusion at any point in the pebble heater's upper bed, keeps them from "bridging" together and causing stoppages in the moving bed.

Rx's for YOUR refractory needs

are included in the broad Norton line of *engineered and prescribed* refractories. For information concerning ALUNDUM heat exchange pebbles or other Norton refractories, or for expert technical aid, call in your Norton Refractories Engineer. Or write to NORTON COMPANY, Refractories Division, 571 New Bond Street, Worcester 6, Mass. *Canadian Representative:* A. P. Green Fire Brick Co., Ltd., Toronto, Canada.

NORTON

REFRACTORIES

Engineered . . . Rx . . . Prescribed

Making better products . . . to make other products better

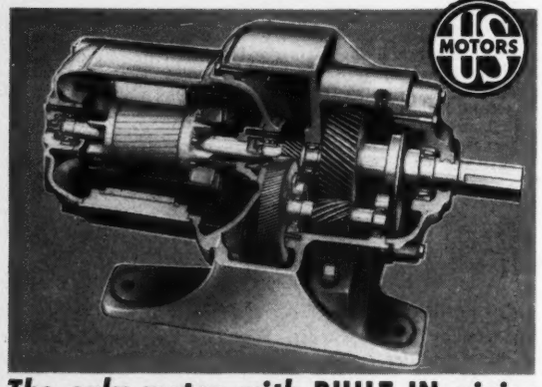
*Trade-Mark Reg. U. S. Pat. Off. and Foreign Countries

When inquiring check CP 3914 on handy form, pgs. 2-3

IN YOUR OPINION, WHICH PINION?

...for longest life in a gearmotor

In an internally geared motor the pinion on the motor shaft is the vital link between motor and gearing. Now compare the U. S. Syncrogear motor pinion with the common type. Note the extra large section area of the U. S. design. It has a long solid shank that anchors into the motor's hollow shaft, whereas the ordinary shell type has a small section area, short keyed. Obviously the U. S. design is most substantial, longer lasting, more resistant to deflection and can carry high speed loads far more safely than the common designs.



The only motor with BUILT-IN *pinion*

U. S. SYNCROGEAR

FREE BOOKLET GIVES THE FACTS

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Name_____
Company_____
Address_____
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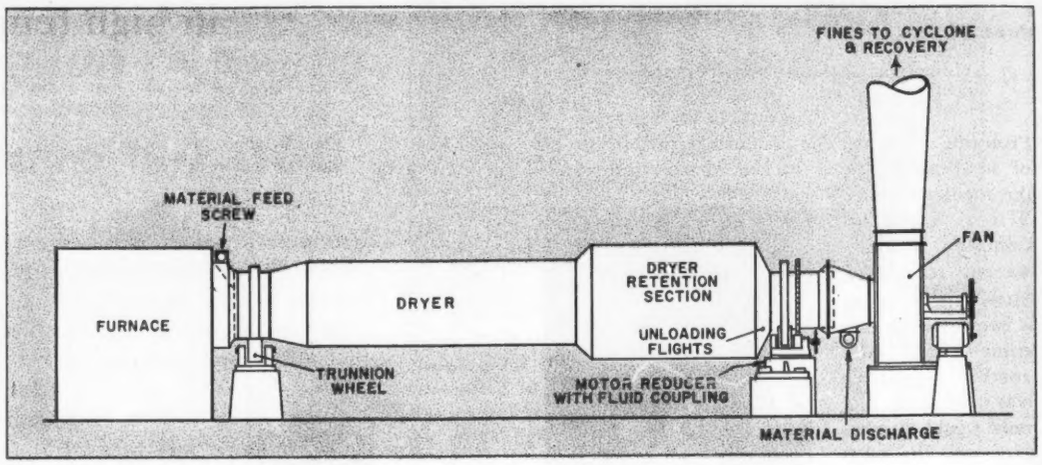
When inquiring check CP 3915 on handy form, pgs. 2-3

new solutions of processing problems



Multi-diameter design automatically regulates material velocities through rotary dryer and results in . . .

more efficient drying of heat-sensitives

Air volume expands in wider sections, decreasing speed, increasing retention in diffusion stage of falling-rate period

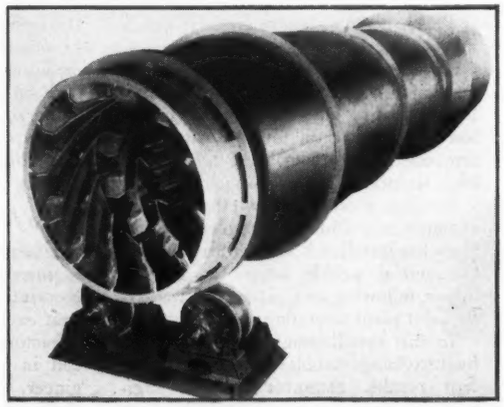
Problem: Particles traveling through air stream of conventional rotary dryers become lighter and tend to pick up speed as they lose moisture. Once surface moisture has been evaporated, however, it is advantageous to slow the particle down, because it takes considerably more time before the internal moisture works itself to the surface for final evaporation by the warm air.

In single-diameter dryers most of the moisture is removed in the hot part of the cylinder and the material rushes through the low temperature end too fast to get rid of the internal moisture. Result is that dryers are usually operated at higher temperatures than would otherwise be necessary, sometimes causing overdrying, scorching, and other damage to heat-sensitive products. In other cases,

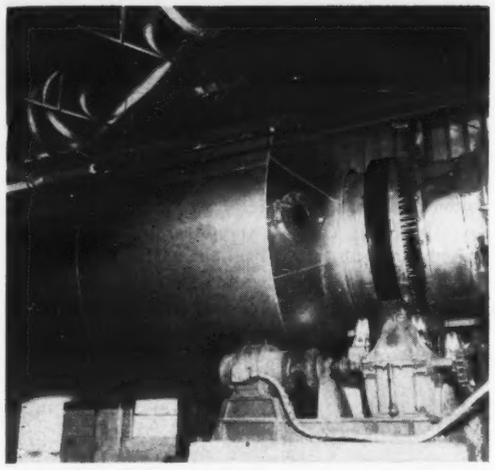
Operating Results* from Dehydro-Mat Dryer at Wildwood, New Jersey

	Feed (Saturated Fish Solids)	Product (Dried Meal)
Rate, tons/hour	40-60	21
Moisture, per cent	55	6
Moisture removed, lb/hour	—	22,060
Manufacturing cost, cents/lb	—	0.069
Unit's overall thermal efficiency, per cent		70

*Based on 6-hour commercial run, using Bunker C fuel oil at rate of 233 gal/hour



View of dryer's feed end showing particle control flights inside and one of four one-ton trunnions



Retention section of 60-ft long dryer has 12-ft diameter. Machine is tilted slightly uphill toward discharge instead of downward, as in most conventional dryers

air flow through dryer is reduced so as to increase hold-up or drying time and maintain lower temperature. This, however, reduces capacity.

Solution: Problem has been solved at New Jersey Menhaden Products, Wildwood, New Jersey, by a single-shell, multiple-diameter, horizontal rotary dryer. The design automatically prolongs particle retention time in the diffusion stage of the falling-rate period, without decreasing capacity. Here is how it works.

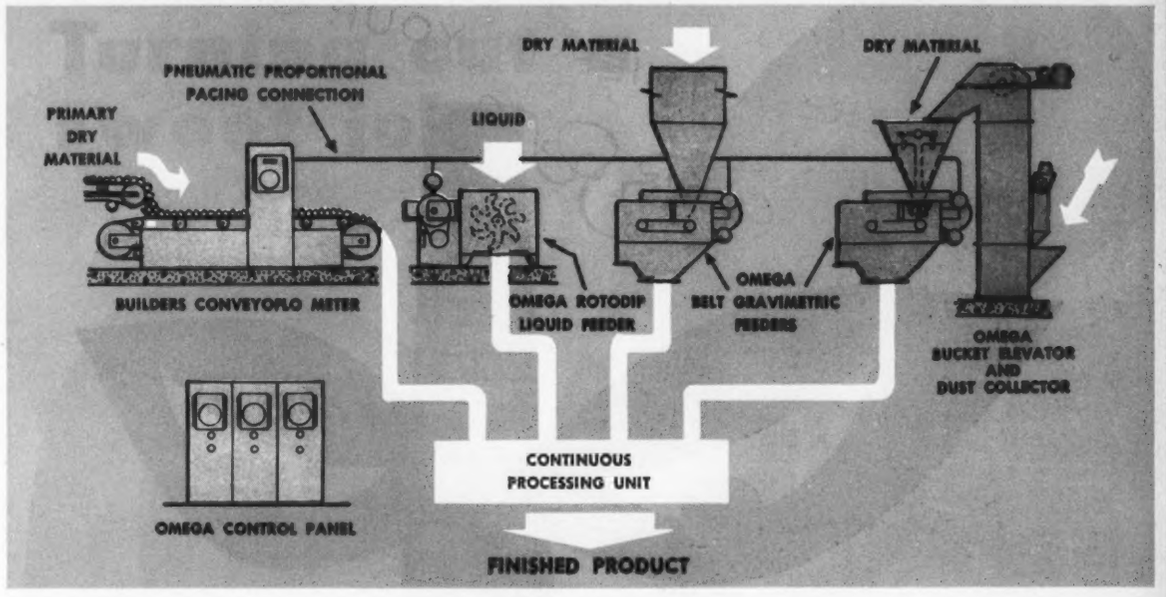
Material—saturated fish solids—enters throat of dryer and meets hot gases direct from furnace mixing chamber. Velocity and temperature at this point are both high, and initial drying is rapid. Passing through the dryer, particle velocities gradually decrease as air volume expands into wider sections, until largest diameter section is reached. Velocity here is lowest and temperature is kept low enough to prevent injury to even the dryest particles. Retention time is controlled by amount of air input and by special unloading flights. Dry material is discharged mechanically through a narrower section and goes to grinding and bagging area. Fines are collected by a cyclone.

Heating is controlled by electronic-pneumatic system, using three recording potentiometers. Thermocouples in furnace, throat, and backbox (air and product exit section) transmit signals which actuate the various air dampers and control oil burners. Furnace can be set at one temperature, throat at another, and backbox at a third temperature. Switch-over to manual control can be accomplished at any time.

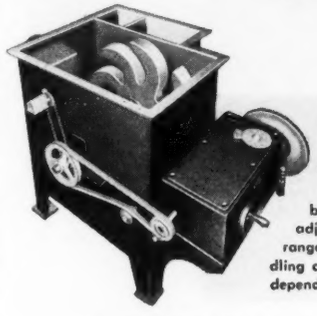
Dryer at Menhaden is 60 ft long and has diameters varying from 6 to 12 ft. Furnace is 30 ft long x

(*Continued on next page*)

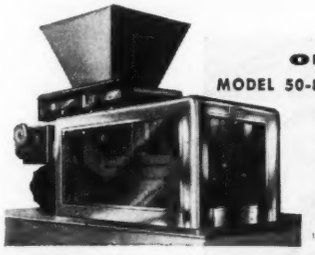
Another tough feeding problem solved by...



OMEGA CONTINUOUS processing!



OMEGA ROTODIP LIQUID FEEDER — accurate within 1% by volume — infinitely adjustable over 100 to 1 range — adaptable for handling corrosive liquids—simple, dependable.



OMEGA MODEL 50-B BELT GRAVIMETRIC (WEIGHING) FEEDER — simple mechanical control — wide feeding range — positive, non-flood rotor available for "floodable" materials—accurate within 1% over entire range specified.

This Omega *equipment package* is the complete solution to a difficult feeding problem for a major food processing company. The Conveyoflo Meter weighs "non-flowable" materials — cohesive, fibrous fruits and vegetables — at high flow rates and with great accuracy. Pneumatic proportional pacing of Omega Dry and Liquid Feeders automatically keeps the flow of secondary materials in step with the primary flow . . . increases processing efficiency . . . insures uniform product quality under all conditions.

The extensive Omega line of Dry and Liquid Feeders is adaptable to all types of feeding and proportioning requirements. Omega *equipment packages* are complete in every detail; from control panel to auto-stop alarm devices, from hopper agitators to bucket elevators and dust collectors.

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(Division of B-I-F Industries, Inc.)
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Please send the following:

- ☐ Bulletin BIF-K7 describing this system
- ☐ Bulletin 35-G5A — Omega Belt Gravimetric Feeder
- ☐ Bulletin 65-H12 — Omega Rotodip Feeders
- ☐ Bulletin 550-H4A — Builders Conveyoflo Meter

Name .....
Company .....
Street .....
City ..... **State** .....

OMEGA *THE LAST WORD IN* FEEDERS
DIVISION OF B-I-F INDUSTRIES, INC. METERS FEEDERS CONTROLS

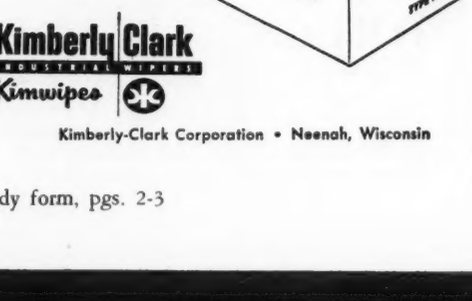
When inquiring check CP 3916 on handy form, pgs. 2-3

IS THERE A THIEF IN YOUR SHOP?

Not if you use new, disposable KIMWIPES!

Don't let expensive cloth and waste wipers rob you of profits. Replace them with Type 1300 KIMWIPES—the *modern* industrial wipers that give you four to ten times more wiper area per dollar!

Yes, and new Kimwipes 1300 are soft, strong and absorbent. A full 12" x 18" in size, they hold up to 8 times their own weight in liquids. They're non-abrasive, too. There's no holdover of metal chips or other infectious material that may cause dermatitis and loss of man hours. Type 1300 Kimwipes are absolutely clean to start with, and are disposed of after use. Ask your salesman for samples. And remember, you can also buy Type 900-S Kimwipes (optical wipers) and Type 900-L Kimwipes (regular wipers). Save money. Order today!



Kimberly Clark
INDUSTRIAL WIPERS
Kimwipes

Kimberly-Clark Corporation • Neenah, Wisconsin

When inquiring check CP 3917 on handy form, pgs. 2-3

(*Continued from preceding page*)

12 ft wide x 18 ft high. A 25 hp motor operates dryer, which rotates on four trunnions, through fluid drive. Exhaust fan is driven by 75 hp motor and moves 75,000 cfm air. Dryer is tilted slightly uphill toward discharge instead of downward, as in most conventional dryers. This is reported to increase capacity.

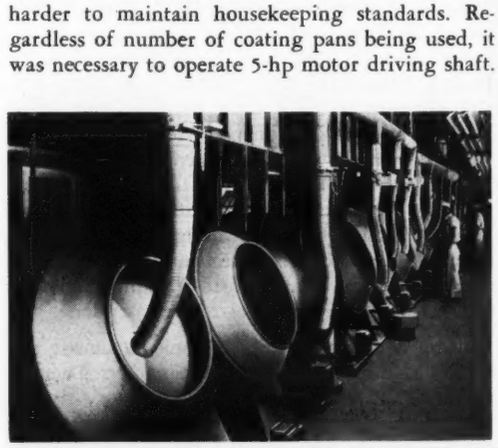
Results: Product is light and fluffy, with no evidence of heat damage of any kind. Dryer starts up rapidly, is easy to regulate, and cools down quickly at end of run. Favorable drying conditions are maintained under widely varying loads. Temperature at discharge end of dryer varies only between $\pm 6°F$ from instrument setting, due to automatic control on burners and dampers.

(Dehydro-mat dryer is manufactured by Edw. Renneburg and Sons Company, Dept. CP, 2639 Boston Street, Baltimore 24, Md. . . . or for more information check CP 3918 on handy form, pages 2 and 3.)

Standard Pharmacal speeds production through use of tablet coating pans with direct drives . . .

make it easier to maintain product uniformity and cleanliness

Problem: If something went wrong with belt drives formerly used on coating pans at Standard Pharmacal Company, Chicago, Ill., entire line was shut down. Dust accumulated on belts and made it harder to maintain housekeeping standards. Regardless of number of coating pans being used, it was necessary to operate 5-hp motor driving shaft.

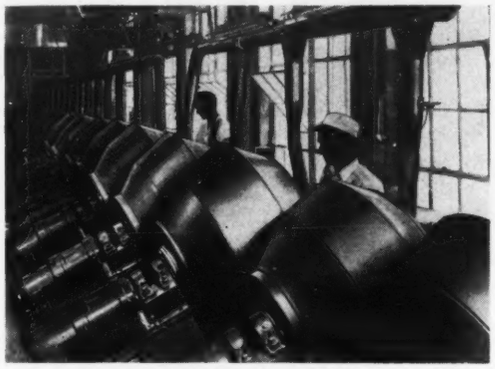


Maintenance of cleanliness is made easier by coating pans, front view of which is shown here

Coating operating was slow, taking about 2½ to 3 days to complete a pan, with one 8-hr shift per day. Syrup, powder, and color were added in one pan and tablets dried. Tablets were transferred to another pan for polishing.

Solution: Approximately a year ago company obtained 20 galvanized coating pans with direct drives. Slippage and breakage of belts or chains are eliminated by this direct drive coupling of shaft to the gear head motor. Use of heavy-duty double pillow block bearings allows greater production loads to be carried. This arrangement also permits a longer overhang, permitting use of larger coating pans than normally would be considered practical.

Coating pans are infinitely variable in speed. Units are completely sealed and mechanism runs in a reservoir of oil. Complete enclosure of drive prevents dust encountered in coating operation from



Rear view of coating pans shows direct drives, which lower operating costs and maintenance

reaching drive mechanism and affecting its operation. All sizes, shapes, and colors of tablets are coated in the pans, which can each handle from 30,000 to 100,000 tablets at one time.

Results: Production has been speeded since the coating pans were placed in operation. It now takes about 2 days or 16 hr to complete a pan in place of 2½ to 3 days. Variable speed drive has been found to be of considerable advantage.

Individual drives have eliminated breakdowns and saved power. It is possible to maintain closer control over operations, improving uniformity of product. Cleanliness so necessary in producing a pharmaceutical product is made easier. No maintenance has been necessary on units.

(Coating pans are product of Arthur Colton Co., Dept. CP, Div. of Snyder Tool & Engineering Co., 3400 E. Lafayette Ave., Detroit 7, Mich. . . . or check CP 3919 on handy form, pages 2 and 3.)

Corrosion Data — featured this month — begins on page 84

The high quality of the famous Hershey Chocolate Bar is known far and wide. And, into the maintenance of that product's well-deserved popularity, goes the processing of just the right kind of sugar.

In the Hershey Chocolate plant eight No. 4-TH-MIKRO-PULVERIZERS set up in tandem units, turn out tons of sugar per hour, reducing it to the required degree of fineness.

It was found that this dual-pass method reduced power consumption and operating time—while delivering at the same time a product which solved other problems in the subsequent processing of the chocolate.

A major part of all the sugar in the world is ground in MIKROS. So too, MIKROS have provided the answer to a great majority of food processing operations where grinding, blending or granulating of fine or ultra-fine powders is required.

The MIKRO area of distinguished service extends far beyond the food field. It also embraces the processing of chemicals, pharmaceuticals, cosmetics, soaps, fertilizers, plastics and many other products and materials.

Submitting your grinding or dust recovery problem to the MIKRO Laboratory involves no obligation on your part. But, the answer provided may be just the right answer for you.

Write for illustrated descriptive bulletin

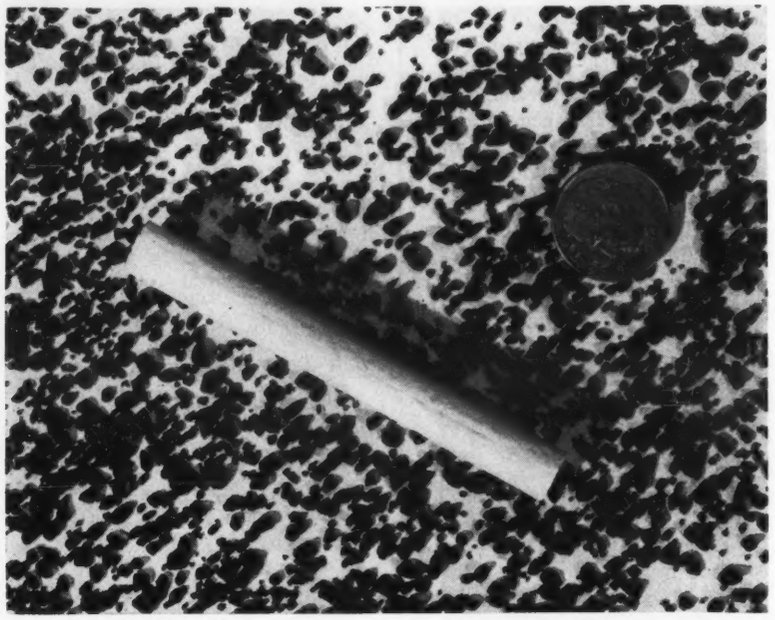
MIKRO

PULVERIZING MACHINERY DIVISION
METALS DISINTEGRATING COMPANY, INC.
60 CHATHAM ROAD SUMMIT, NEW JERSEY

PULVERIZING • AIR CONVEYING • DUST COLLECTING EQUIPMENT

When inquiring check CP 3920 on handy form, pgs. 2-3

At Clinton Foods Inc., improved color and better overall yield during crystallization result when —



Size comparison of granular activated carbon is shown by cigarette and dime

activated granular carbon replaces bone char in decolorizing dextrose

CHARLES H. PELTON, Chief Chemical Engineer, Clinton Foods Inc., Corn Processing Div., Clinton, Iowa
with **FRANK E. McELROY,** Assistant Editor

Problem: Decolorizing method used in refining dextrose at Clinton Foods, manufacturers of bulk food products from corn, limited production and was not efficient in removal of color bodies.

One of company's major products is refined dextrose hydrate, called Clintose®, of which about 430,000 pounds a day is produced. As 28°Be hydrolysate liquor, it is passed through three filter beds of carbon to remove color bodies and facilitate crystallization of first sugar. Bottleneck in refining process was the decolorizing step in which bone char was used. Not only did this take considerable time, but the char had to be revivified in kilns at frequent intervals.

Solution: Four years ago, Clinton Foods replaced the bone char with a specially refined granular activated carbon made from coal, and called Pittsburgh Type SG. Clinton used its existing filter bed setup of 19 units. A six hearth Herreshoff furnace was installed two years later for thermal reactivation of the carbon, making this the first large-scale integrated application of the decolorizing system. (Before furnace was put in, Clinton returned spent granular carbon to manufacturer for reactivation.)

Type SG carbon combines the advantages of high efficiency obtainable by counter-current operation of columns of granular adsorbent, and the high decolorizing capacity usually associated with pulverized adsorbents. It is intended for use in deep columns, and has a particle size distribution such that pressure drop will not be excessive. Recommended flow rates are $\frac{1}{4}$-$1\frac{1}{2}$ gpm/sq ft.

Carbon contains about 0.5-0.7% of acid-soluble iron which may cause some difficulty in first few cycles of low pH liquor. Clinton treats make-up carbon with HCl to remove this iron. As in bone char refining, an after-treatment with pulverized vegetable carbon is used to remove final impurities.

Results: Objectives of better decolorization and increased plant capacity have been realized. Color is improved and contributes to better overall yield in crystallization. Eight to ten times the former quantity of hydrolysate liquor can be processed for an equal volume of decolorant. Laboratory tests show that up to 16 times greater efficiencies are possible.

An added plus value is that carbon removes color precursors, such as hydroxymethyl furfural and other trace impurities of low molecular weight, which might form color during later processing and storage. Net result is a brighter finished sugar of greatly increased storage life, less darkening of liquors in process, and general lower levels of color in recycled streams.

Reactivation of the carbon brings it back to its original decoloring efficiency. Equivalent of one bed a day is reactivated on first sugar. Contrast this with the six to ten beds of bone char reactivated each day before. Since Pittsburgh SG carbon is only half as dense as char, savings on a weight basis are even greater. Based on pounds of Clintose produced, activated granular carbon has proved economically favorable. In addi-

Typical Physical Characteristics

"Type SG" Carbon

Adsorptive	
Surface area (BET Nitrogen, sq M/gm)	1000-1100
Iodine number (Adsorbed with 0.02N I_2/KI soln, mg/gm)	950-1050
Molasses number (*)	225-250
Structural	
Particle size distribution (US Screen)	8x30
Mean particle diameter (mm)	1.5-1.65
Bulk density (max, gm/cc)	0.44-0.48
Hardness (% mean particle diam. after shaking in concave pan on Ro-Tap 20 min. with 10 each ½" and ¾" steel balls)	75-85
Porosity (total pore volume, cc/gm)	0.9-1.1
Voidage (space between particles, %)	39-42

*Molasses number is determined by method given by J. W. Hassler in "Active Carbon, The Modern Purifier," p. 90 (1941).

tion, it has replaced bone char on second sugar decolorizing. With the increase in plant capacity made available, Clinton now provides granular carbon purification for its syrup, giving it longer shelf life and superior cooking characteristics in candy manufacture.

Other applications of activated carbons are in adsorption of low concentrations of materials in aqueous solutions, making practical their recovery by elution with specific chemical reagents. Use in non-aqueous solvents is also favorably indicated.

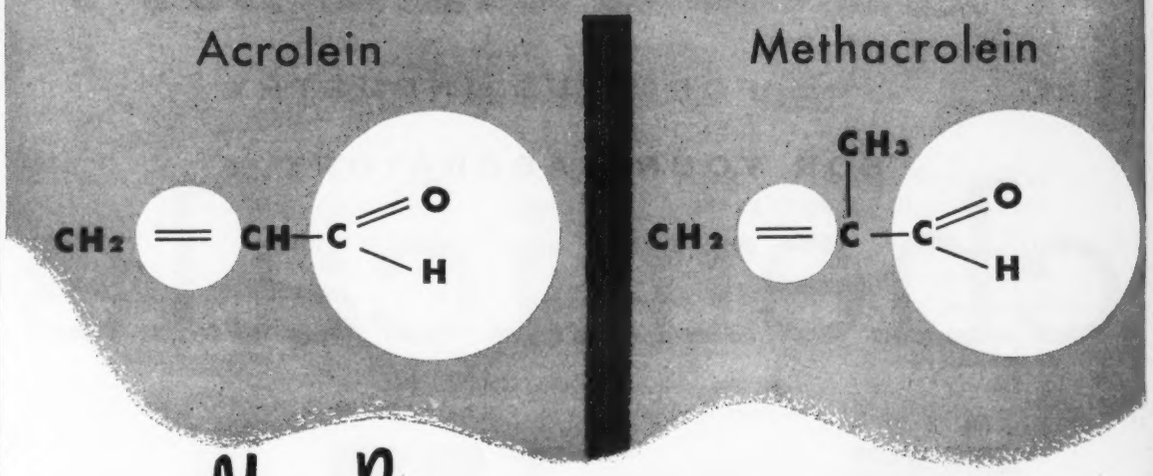
Granular activated carbon should find many applications where pulverized carbons are in use now. The non-specific, general purpose carbon can lend its advantages of high density, physical and chemical stability, and ease of regeneration to these applications.

Other granular carbons are available for vapor phase applications such as solvent recovery, gas purification, catalysis, and odor control.

(Activated carbon for decolorizing is a product of Activated Carbon Div., Pittsburgh Coke & Chemical Co., Dept. CP, Grant Bldg., Pittsburgh 19, Pa. . . . or for more information check CP 3921 on handy form, pages 2 and 3.)

Mixed Acid Corrosion figures for any combination — see triangular plots, pages 84-86

THESE REACTIVE INTERMEDIATES...



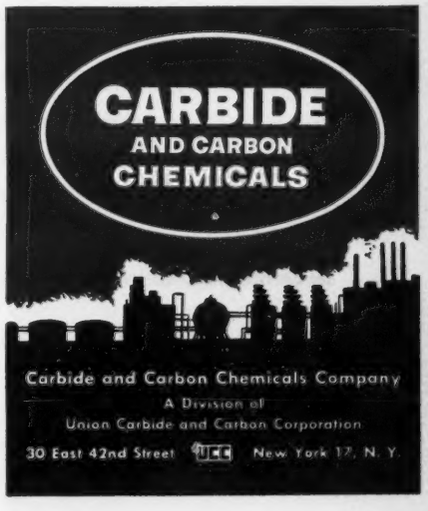
Mean Business... IN

- pharmaceuticals
- dye intermediates
- odorants
- amino acids
- resins for textiles, paper, linoleum, and adhesives
- copolymers with acrylonitrile, acrylic esters, butadiene, and styrene

Because of the reactivity of their aldehyde and ethylenic groups, acrolein and methacrolein can lead the way to an almost unlimited number of products. You can react the ethylenic group with halogens, halogen acids, 1, 3-dienes, alcohols, and mercaptans—the aldehyde group with anhydrides, Grignard reagents, alcohols, and HCN. To increase the possibilities still further, under the proper conditions the aldehyde and ethylenic groups will react either individually or simultaneously.

Reactions already reported include: for acrolein, preparation of the amino acids methionine and lysine, 2-amino pyrimidine, folic acid, substituted quinolines, benzanthrone, odorants by Diels-Alder condensations with butadiene and substituted butadienes, and coating resins by reaction with urea, thiourea, and polyhydric compounds—for methacrolein, copolymers with high softening points and good solvent resistance, and resins for impregnating fabrics, linoleum, and adhesives.

Write the nearest CARBIDE office for samples and further information so that you can investigate them in your own laboratories. In Canada: Carbide Chemicals Sales Company, Division of Union Carbide Canada Limited, Toronto.



When inquiring check CP 3922 on handy form, pgs. 2-3

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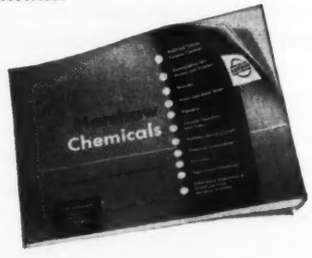

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When inquiring check CP 3923 on handy form, pgs. 2-3

Organic esters of boric acid available in lab quantities for test purposes

Organic esters of boric acid are offered in laboratory quantities for test purposes. Soluble in all proportions in most organic solvents, compounds hydrolyze rapidly in contact with water or moist air. Hydrolysis is retarded when dissolved in organic solvents. First five compounds below are colorless liquids.

Trimethyl borate, $(CH_3O)_3B$, has a sp gr of 0.92 (at 20°C) and boils at 67-69°C. Per cent boron is 10.24. In flash point determination, compound hyrolyzes rapidly to methyl alcohol having a flash point of 60°F.

Tri-n-butyl borate, $(C_4H_9O)_3B$, has sp gr of 0.847 (at 28°C) and boils at 228-229°C. It has 4.68% boron and a flash point of 200°F.

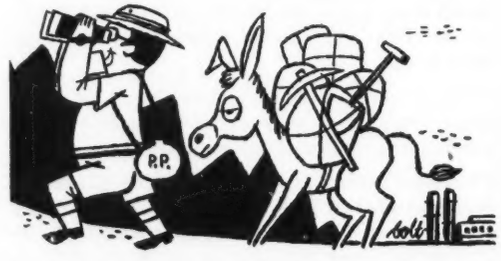
Tri-n-amyl borate, $(C_5H_{11}O)_3B$, has sp gr of 0.852 (at 27°C), boiling range of 110-114°C (at 2 mm pressure), and a flash point of 265°F.

Tri-n-hexyl borate, $(C_6H_{13}O)_3B$, has 0.847 (at 28°C) sp gr, boils at 140-146°C (at 2 mm), and flash point is 300°F.

Tri-n-octyl borate, $(C_8H_{17}O)_3B$, has a sp gr of 0.846 (at 23°C), boils at 192-194°C (at 2 mm), and has a flash point of 370°F.

Tri-n-dodecyl borate, $(C_{12}H_{25}O)_3B$ has sp gr of 0.845 (at 27°C), and boils at 270-292°C (at 1-2 mm). Flash point is 465°F, and color is light straw yellow.

(Boric acid esters are products of Pacific Coast Borax Co., Div. of Borax Consolidated, Ltd., Dept. CP, 100 Park Ave., New York 17, N.Y. . . . or check CP 3924 on handy form, pages 2 and 3.)



Looking for a chemical raw material or intermediate? . . .

The alphabetical Product Directory (pages 199 to 201) will help you find it in a hurry. This listing, started by CHEMICAL PROCESSING in 1938, "puts the finger" on all subjects and products in editorial columns and advertisements of each issue.

Commercial availability of allo-ocimene announced . . .

compound polymerizes readily, has three double bonds

Uses: Should find application as a chemical intermediate or as a modifying agent in unsaturated systems.

Features: Compound polymerizes readily and contains three conjugated double bonds. It is commercially available in drum and tank car quantities.

Description: Allo-Ocimene-85 is approximately 80% *allo*-ocimene, $C_{10}H_{16}$. The balance consists of isomers and small amounts of monocyclic terpenes. Physical propertie include:

Refractive index (@ 25°C)	1.532
Sp gr (@ 15.5°C)	0.832
% distilled @ 6°C	5-80

(*allo*-Ocimene is a product of The Glidden Co., Naval Stores Div., Dept. CP, P.O. Box 389, Jacksonville 1, Fla. . . . or for more information check CP 3925 on handy form, pages 2 and 3.)

Paper coating with resins

Advantages, application, and uses of paper coating based on Polyamide Resin 100 with certain epoxy resins are covered in 4-page bulletin. Suggested for use where high gloss, excellent abrasion resistance, high flexibility, and a rich depth of color are desired, the coating is satisfactorily applied using varnishing machines with hard Thiokol rubber rolls.

Bul 11-7-1 is issued by Chemical Div., General Mills, Inc., Dept. CP, 2010 E. Hennepin, Minneapolis 13, Minn. When inquiring specify CP 3926 on handy form, pages 2 and 3.

For more information on product at right, specify CP 3927 . . . see information request blank between pages 2 and 3.

DAVISON BULLETIN

LIGHT AS A FEATHER **SYLOID 244®**

Syloid 244 is a highly porous pure silica gel of extremely low density. A free-flowing white powder, it appears as a fluffy snow weighing 4-4.5 pounds per cubic foot as shipped. Syloid 244 has an apparent particle size of 2-3 microns, yet individual particles are predominantly below one micron.

The chemical and physical characteristics of Syloid 244 makes it adaptable for many uses including the following:

- anti-blocking of clear plastic film
- an additive to inks for quick-drying
- a vinyl flatting agent
- anti-caking for powdered products
- thickening agent for salves, lubricants and plastigels

Progress Through Chemistry

DAVISON CHEMICAL COMPANY
Division of W. R. Grace & Co.
Baltimore 3, Maryland

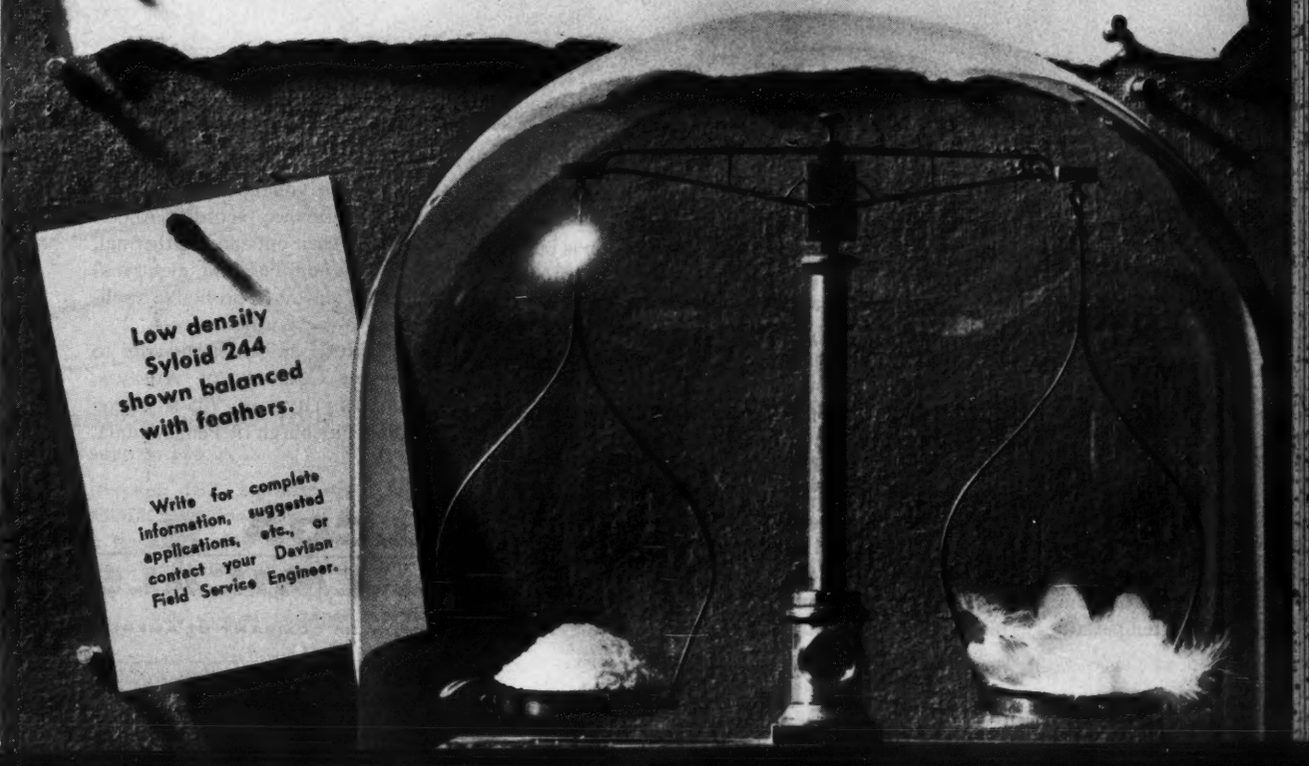
Producers of: Catalysts, Inorganic Acids, Superphosphates, Triple Superphosphates, Phosphate Rock, Silica Gels and Silicofluorides. Sole Producers of DAVCO® Granulated Fertilizers.

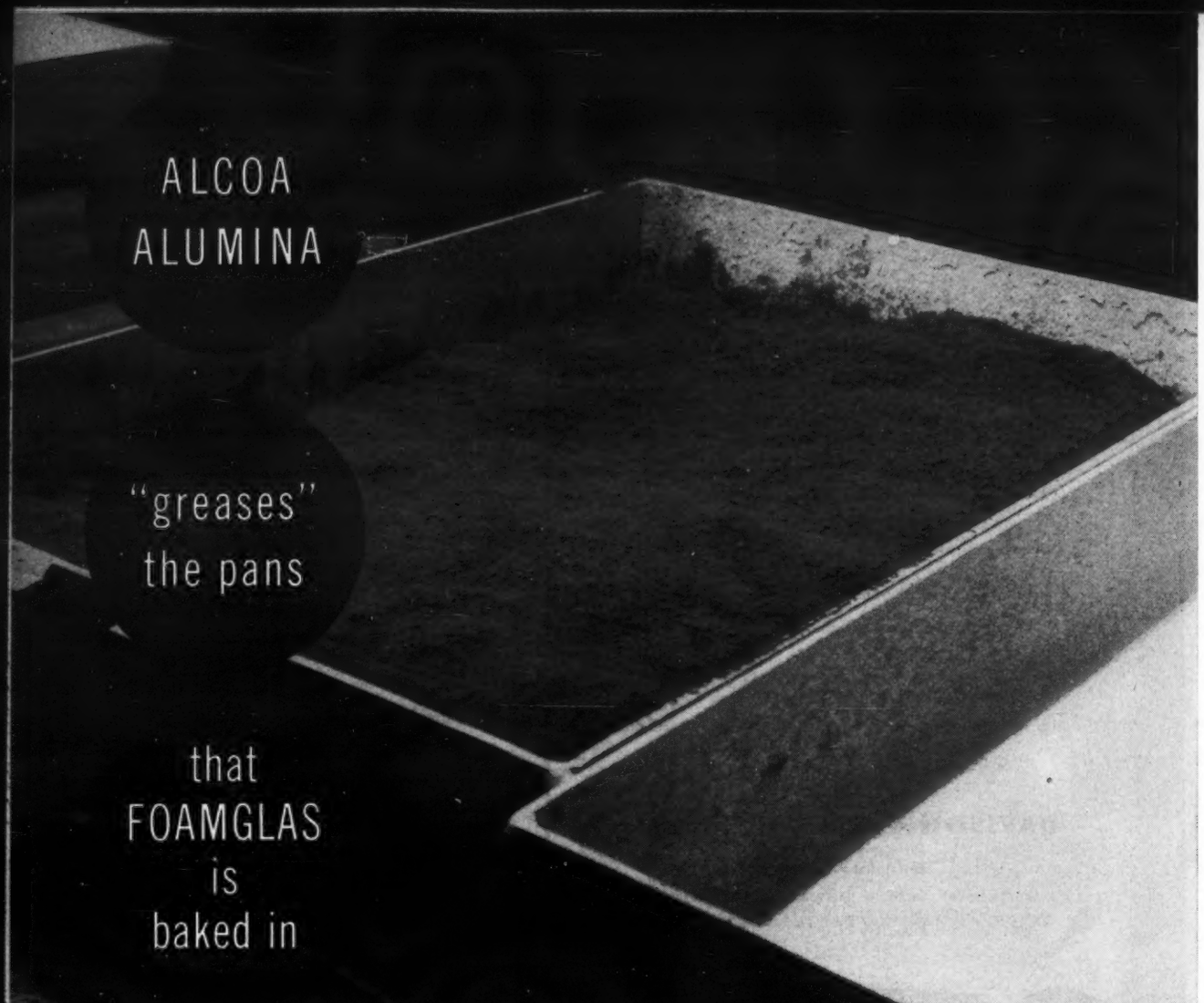
TYPICAL CHEMICAL AND PHYSICAL CHARACTERISTICS OF SYLOID 244

Color	white, 94 Hunter reflectometer transparent in vehicles
Appearance	uniform, free-flowing powder
Density	
as shipped	4-4.5 lbs./cu. ft.
centrifuged in toluol	7.5 lbs./cu. ft.
true (specific gravity)	2.1-2.2
pH	7.2
Silica as SiO_2 (dry basis)	99.5%
Oil adsorption	240 lbs. oil/100 lbs. SiO_2
Surface area (nitrogen)	292 M_2/gram

PARTICLE SIZE DISTRIBUTION BY WEIGHT
(water sedimentation)

	5% less than 1.1 microns
10	1.4
20	2.0
40	3.0
50	3.7
60	4.5
80	7.0


Low density Syloid 244 shown balanced with feathers.
Write for complete information, suggested applications, etc., or contact your Davison Field Service Engineer.



What do you use to "grease" a pan when baking temperatures reach 1700°F? Pittsburgh Corning Corporation has the answer. They use ALCOA Alumina to keep loaves of FOAMGLAS® from sticking to the baking molds.

The making of this cellular glass insulation is a king-sized baking operation. Specially compounded ground glass and a cellulating chemical are mixed, placed in pans that have been coated with ALCOA Alumina and baked at 1700°F. The FOAMGLAS rises like bread, hardens and, because ALCOA Alumina does not melt even at temperatures as high as 3700°, the loaves are easily removed from the pans.

This unusual application is but one of many high-temperature processes made possible or more practical by ALCOA Aluminas. Because of their unusual strength and stability at high temperatures, they are used to fortify super-refractories, thus increasing the output of furnaces, kilns and glass tanks. Spark plug porcelains, special cements, heat exchanger pebbles, laboratory ware, catalyst bed supports—all perform better, longer, when they contain ALCOA Aluminas. And performance improves as the alumina content increases!

Let us tell you about the exceptional performance record of ALCOA Aluminas. Their outstanding thermal, physical, chemical and electrical properties may have profitable applications in your business.

For further information write to ALUMINUM COMPANY OF AMERICA, CHEMICALS DIVISION, 705-M Alcoa Building, Pittsburgh 19, Pennsylvania.

ALCOA CHEMICALS

ALUMINUM COMPANY OF AMERICA

Prevents slime formation in pulp and paper manufacturing

Uses: By inhibiting growth of slime-forming organisms, product prevents formation of various slimes in pulp and paper industry.

Features: Slimicide is highly efficient, leaves no color or odor in the paper, will not corrode screens or metal surfaces. It is non-toxic and presents no hazards when normal safety precautions are taken. Material has no affinity for fibers, and will not affect pH of the system.

Description: Slimodyn® is a composition of very finely dispersed silver alloy and an organomercurial in a liquid carrier. Packed in 50 and 500 lb returnable stainless steel containers, slimicide can be stored easily as it is not affected by heat or cold. In use, it can be employed by either "shock treatment" or continuous treatment.

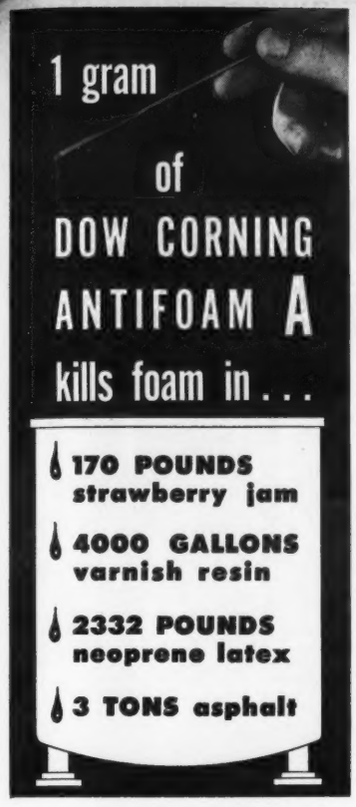
(Slime control agent is a product of United States Movidyn Corp., Dept. CP, 863 N. Orleans St., Chicago 10, Ill. . . . or for more information check CP 3928 on handy form, pages 2 and 3.)

Describes pentaerythritol in resin manufacturing

Specifications, suggested alkyd resin formulations, and methods of laboratory analysis of pentaerythritol are covered in detail in 12-page bulletin written for resin producers.

"Pentaerythritol" is issued by Chemical Division, Celanese Corporation of America, Dept. CP, 180 Madison Ave., New York 16, N. Y. When inquiring specify CP 3929 on handy form, pages 2 and 3.

For more information on product at left, specify CP 3930 . . . see information request blank between pages 2 and 3.



Effective at very low concentrations, Dow Corning Antifoam A Compound is the most economical, the most efficient and the most versatile foam-killer ever developed. Odorless and tasteless, this silicone defoamer is physiologically harmless in foods at concentrations up to 10 parts per million. Thousands of chemical and food processing plants depend on Dow Corning Antifoam A to cut processing time, to save productive capacity now wasted on foam, and to eliminate wasteful and hazardous overflow.

DOW CORNING ANTIFOAM AF EMULSION

is a dilutable defoamer containing 30% Antifoam A. It is easily dispersed, equally versatile and equally effective against aqueous foamers. It is safe to use in food processing at concentrations up to 10 parts Antifoam A per million parts of the foamer.

mail coupon TODAY for **free sample**

DOW CORNING SILICONES

Dow Corning Corporation
Midland, Mich., Dept. BB-24

Please send me data and a free sample of
☐ Dow Corning Antifoam A
or ☐ Dow Corning Antifoam AF Emulsion

NAME_____
COMPANY_____
ADDRESS_____
CITY_____ ZONE____ STATE____

When inquiring check CP 3931 on handy form, pgs. 2-3

Increases dispersal of fluids injected into tissues . . .

highly purified hyaluronidase is non-irritating, has excellent stability

Uses: To increase the rapidity of dispersal in the tissues of fluids injected subcutaneously or intramuscularly, such as in the administration of solutions, drugs, or anesthetics.

Features: By hastening the infiltration or spread by fluids through tissues, compound reduces local swelling and pain. It is easily given anywhere, requiring no intricate equipment or specially trained personnel. Sensitivity is rare and toxicity practically negligible. It is non-irritationg and has excellent stability.

Description: Infiltrase is highly purified hyaluronidase from animal sources. As a white lyophilized powder, it is completely water soluble. It is available in one or ten cc vials, containing 150 turbidity-reducing units per cc.

(Highly purified hyaluronidase is a product of The Armour Laboratories, Division of Armour & Co., Dept. CP, 520 N. Michigan Ave, Chicago 11, Ill. . . . or for more information check CP 3932 on handy form, pages 2 and 3.)

IS CORROSION LICKING YOU?

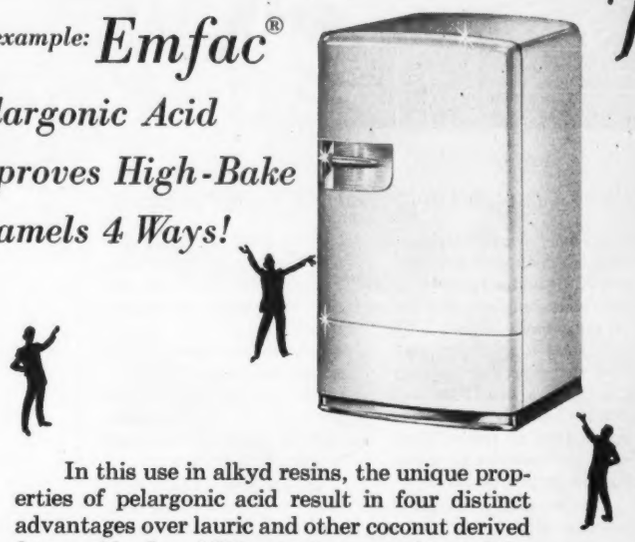
Then, be sure to see . . .

pages 51 through 102, our featured CORROSION CONTROL section. How other plants have licked their corrosion problems is told in a variety of performance stories. Latest developments in materials and equipment are presented . . . plus a host of other topics.

THE ODD CARBON MAKES PELARGONIC ACID DIFFERENT

for example: **Emfac®**

Pelargonic Acid Improves High-Bake Enamels 4 Ways!



In this use in alkyd resins, the unique properties of pelargonic acid result in four distinct advantages over lauric and other coconut derived fatty acids. In addition to faster cooking of the resin itself, films of white enamel made from pelargonic acid are harder, exhibit higher gloss, and possess greater resistance to yellowing.

As in the application above, Emfac Pelargonic Acid may give your product just the competitive advantage you've been striving for ...or, it may be the answer to a possible problem of stability, melting point, solubility or consistency. Why not check this C_9, saturated, liquid, monobasic acid and see if it can give you a competitive advantage.

Write for sample or mail coupon for descriptive literature.

Emery

Fatty Acids & Derivatives
Plastolein Plasticizers
Twitchell Oils, Emulsifiers

EMERY INDUSTRIES, INC. • Carew Tower, Cincinnati 2
New York • Philadelphia • Lowell, Mass. • Chicago
San Francisco • Cleveland
Warehouse stocks also in St. Louis, Buffalo, Baltimore and Los Angeles
Export: 5035 RCA Bldg., New York 20, N. Y.

Emery Industries, Inc.
Dept. CP-12, Carew Tower
Cincinnati 2, Ohio

Please send me literature checked below.
☐ Technical Bulletin on Pelargonic Acid
☐ Use of Pelargonic in High-Baked Enamels

Name_____ Title_____
Company_____
Address_____
City_____ State_____

When inquiring check CP 3933 on handy form, pgs. 2-3

TAKE IT EASY by Polyco

"Poor Harry! He's still trying to find the right polymer!"

It's a hopeless task trying to keep up-to-date on polymeric resins. The industry comes up with something new and better every day.

So, take it easy! Just contact the American Polymer Company, a firm that does nothing but polymerize—and polymerizes all resins. Then, make it responsible for giving you the properties you need.

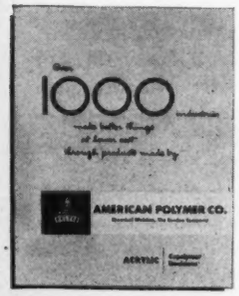
Such a challenge is always welcome at American Polymer Company. Here, we *personalize polymers* to fit specific applications.

What kind? All kinds! Today it might be a polyvinyl acetate emulsion . . . or solution. Tomorrow, a styrene-butadiene latex . . . a vinyl copolymer emulsion . . . an acrylic copolymer solution . . . or a butadiene-acrylonitrile latex. To date, we've polymerized resins in thousands of different formulas.

Investigate! Learn more about our personalized polymer service. Have a confidential talk with our representative. Why not write today?

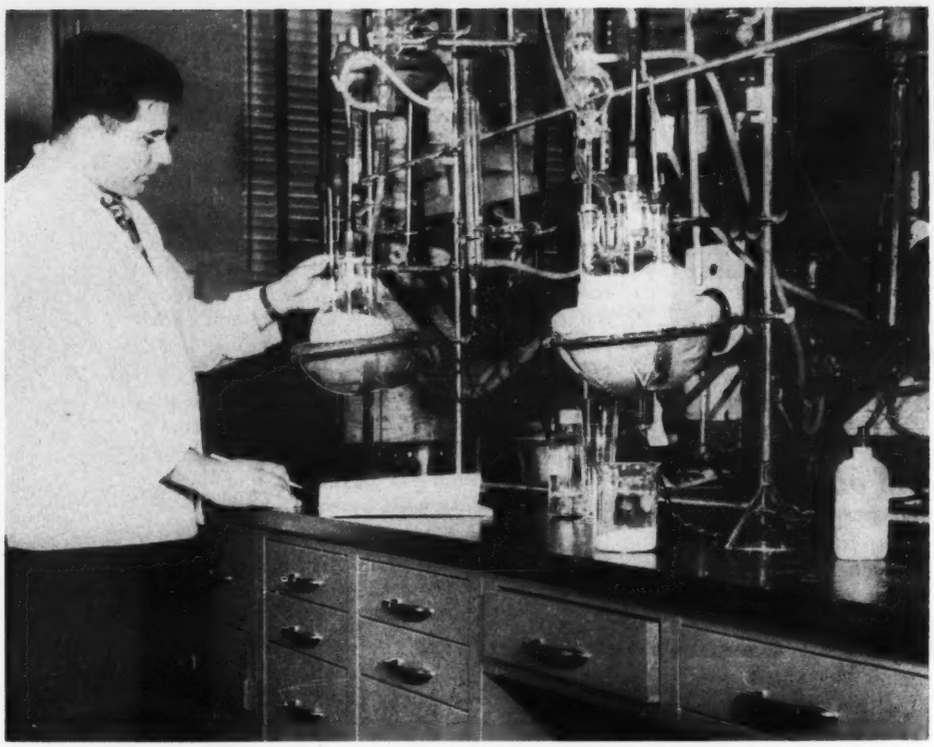
AMERICAN POLYMER CO.
Chemical Division, The Borden Company
General Offices: 101 FOSTER STREET, PEABODY, MASSACHUSETTS

Personalizes ALL KINDS OF RESINS



Send for *this NEW comprehensive brochure covering ACRYLIC COPOLYMER EMULSIONS. It will show you how to take advantage of American Polymer Co.'s personalized polymer service. Write American Polymer Co., Peabody, Mass., for brochure P-57,* ACRYLIC COPOLYMER EMULSIONS. *It's* **FREE!**

When inquiring check CP 3934 on handy form, pgs. 2-3



Laboratory equipment at Celanese in which development of resin was initiated

Case history in which textile manufacturer was helped to make own resin shows how —

technical service lowers production costs

Results in improved operating efficiency at plant while producing fabric with desired characteristics

Increasingly important roll which technical service is taking in the chemical industry is illustrated by a recent case in which the Chemical Division of Celanese Corporation of America aided a textile manufacturer to produce his own finishing resin. As a result, the manufacturer is producing a high quality product at lower costs. Finishing resin, made from flake paraformaldehyde, imparts satisfactory "hand" or proper body and softness to the fabric, eliminating roughness. This has been achieved with an increase in operating efficiency.

Much of the development work on the resin was accomplished at the Customer Service Laboratory of the Celanese Chemical Division at Summit, N. J. Research facilities have been set up here and technical men trained specifically to handle projects leading to improvements in product quality and processing efficiency. Modern laboratory and pilot plant equipment furnish specialized service to many companies, pointing the way to more efficient use or selection of more economical raw materials. Steps which led to the manufacture of the textile resin by the customer — which will be referred to as Company X — follow:

Development work was initiated in July 1953 when an inquiry was received for information on the preparation of a polymeric urea formaldehyde resin. Celanese had recently started production of paraformaldehyde, the raw material for the resin, in a new unit at its Bishop, Texas plant. Samples were sent out and a procedure suggested for use.

Technical service engineer at left operates pilot plant reactor used for making resin

In Feb. 1954 Company X requested additional information with respect to any recent developments on paraformaldehyde for the same use. Information was sent to them and a visit was made to the customer by technical service engineers to discuss the problem.

From this visit, Celanese obtained information which allowed company to be of greater assistance. Textile resin was produced in the laboratory and later in pilot plant facilities. On March 19 a second visit was made to customer's plant.

On April 2 representatives of the Research Div. of Company X visited the Celanese laboratory at Summit to inspect the equipment used for production of the resin. On that day additional samples were made and taken back by the research representatives.

These samples were evaluated further in the customer's own laboratories. Sufficient resin made in pilot plant facilities was then furnished for a plant run. When results proved satisfactory, Company X made the decision to purchase a reactor for manufacturing the resin. Recommendations were requested and received as to the design and size of such a reactor and accompanying condenser.

As a result, the customer obtained a 500 gal reactor

(*Continued on next page*)

The Industries We Serve— PLASTICS

Billion Dollar Giant—At Their Service!

So many *good* things are made of plastics today. From the time you comb your hair in the morning until you snap off your television set at night, the magic realm of plastics is at your service. There's hardly another material as strong, light, durable or as easily processed into eye-appealing forms as the products of this giant young industry, which has doubled its growth every five years since 1930.

As an integrated producer of coal-derived products, Pittsburgh Coke & Chemical provides plastics makers with many of their important "building block" chemicals—phthalic anhydride, benzene and phenol, to name just a few.

And the company's Plasticizer Division is one of the nation's leading basic producers of the important compounds that impart flexibility to your vinyl floor tile, garden hose and scores of other useful products in your home and business.

Pittsburgh PX Plasticizers—and all other products of our ten integrated divisions—are quality-controlled from coal to final processing: *better* products for industry and agriculture . . . because Pittsburgh is *basic.*

PITTSBURGH
COKE & CHEMICAL CO.

W&D-5299

COAL CHEMICALS • AGRICULTURAL CHEMICALS • FINE CHEMICALS • PROTECTIVE COATINGS • PLASTICIZERS • ACTIVATED CARBON • COKE • CEMENT • PIG IRON

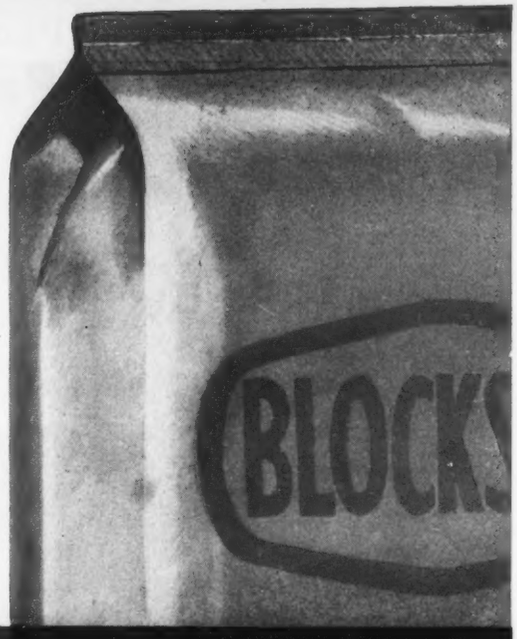
When inquiring check CP 3935 on handy form, pgs. 2-3

Sodium Tripolyphosphate

Tetrasodium Pyrophosphate
ANHYDROUS

Sodium Polyphos
(SODIUM HEXAMETAPHOSPHATE)
(SODIUM TETRAPHOSPHATE)

Trisodium Phosphate
CRYSTALLINE
MONOHYDRATE



Sodium Phosphates

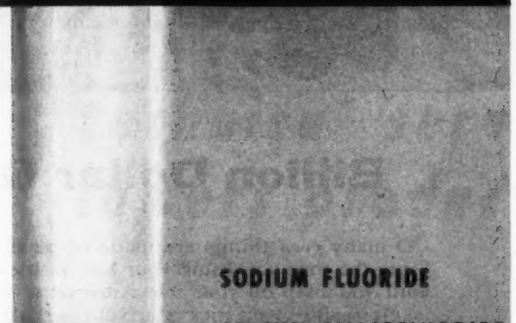
BLOCKSON

Chlorinated Trisodium Phosphate

Disodium Phosphate
ANHYDROUS
CRYSTALLINE

Monosodium Phosphate
ANHYDROUS
MONOHYDRATE

Sodium Acid Pyrophosphate



also major producers of:
SODIUM FLUORIDE
SODIUM SILICOFLUORIDE
HYGRADE FERTILIZER

BLOCKSON CHEMICAL COMPANY • JOLIET, ILLINOIS

When inquiring check CP 3936 on handy form, pgs. 2-3

(*Continued from preceding page*)

and other necessary equipment for production of the resin. In early June 1954, Company X started manufacturing their own resin, using flake paraformaldehyde as the raw material.

Since then, the finishing resin has been found to be highly satisfactory in imparting desired characteristics to the fabric. Less resin than anticipated is required to do the job. Plant operating efficiency has been improved and costs reduced.

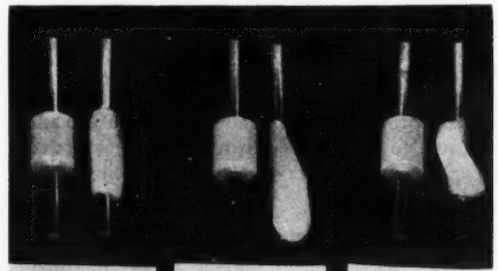
(Information on Customer Service Laboratory may be obtained from Celanese Corp. of America, Chemical Division, Dept. CP, 1000 Morris Court, Summit, New Jersey.)

Improved high-temperature properties, outstanding resistance to cracking given to polyethylene film . . .

controlled irradiation with high energy electrons sets up cross-links between chains

Uses: For applications where a tough, moisture-, chemical-, and temperature-resistant polyethylene is required.

Features: Product does not melt at temperatures as high as 350°F. Tensile strengths range from



Irradiation improves heat resistance of polyethylene. Treated samples retain shape; the untreated distort

about 2000 psi at room temperature to 100-200 psi at 230°F. Material retains this residual strength at least to 392°F.

Outstanding resistance to cracking under stress in soaps, detergents, acids, solvents, and other corrosive media is exhibited. No samples have cracked after several months' exposure to these media. Under identical conditions, most samples of conventional material cracked in a matter of just a few days.

Description: Irrathene polyethylene 101 is produced by irradiating polyethylene film with high

energy electrons. Bombardment knocks a few hydrogen atoms from the molecules, and sets up carbon-to-carbon cross-links between chains. Conventional polyethylene is converted to an insoluble (but swellable) and infusible plastic. Amount of cross-linking depends upon duration of exposure. Irrathene 101 is lightly cross-linked to make it non-melting, but not hurt any desirable properties.

Material contains no residual radioactivity, and has the following physical and electrical properties.

Tensile strength (psi)	1800-2200
Modulus of elasticity (psi x 10^5)	18-20
Ultimate elongation (%)	500-600
Hardness (Rockwell)	R-11
Sp gr	0.92
Dielectric strength (5 mil film, S/T @ 25°C, vpm)	2500
Power factor (60c to 10^5mc)	<0.0005
Dielectric constant (60c to 10^5mc)	2.3
Insulation resistance (80-100 mil, megohms x 10^6)	>20

For continuous operation at temperatures above 212°F, material must be protected from contact with air. At high temperatures, solvents which normally dissolve polyethylene are found to swell Irrathene 101 badly, although it does not dissolve. Material is available in developmental quantities in 0.005" x 1" x 36 yd rolls.

(Product of Chemical Div., General Electric Co., Dept. CP, 1 Plastics Ave., Pittsfield, Mass. Check CP 3937, pages 2 and 3.)

Sealed-in by harmless covering, flavor line remains stable in storage and mixing . . .

precise measurement of quantity, and uniform distribution in batch are obtained easily

Uses: Flavoring pharmaceutical products, foods.

Features: Coated flavor granules give stability to flavor itself while in storage as well as in the finished product. Laboratory tests show no change in taste or strength over a period of one year. Precise measurement of quantity and uniform distribution throughout batch are obtained easily.

Description: Polvaromas flavors have particle size of 100 mesh. They are available in all popular flavors such as peppermint, strawberry, and many others. Process of manufacture envelops each drop of flavor with a solid protective coating which is edible, non-toxic, and water-soluble.

Coating will withstand tabletting pressure, is stable in presence of acids such as citric and tartaric. Amount of flavor suggested for pharmaceutical tablets is about two ounces per 100 pounds.

(Sealed-in flavors are a development of Polak & Schwarz, Inc., Dept. CP, 667 Washington St., New York 14, N.Y. Check CP 3938, pages 2 and 3.)

Here's Aluminum Chloride

in the RIGHT SIZE for your use

Most often, a particular process using aluminum chloride, anhydrous, works best with a selected particle size.

We have taken technical liberties in this picture (exposing aluminum chloride to the air) to show you the *four* sizes available from Hooker.

Extra work of screening isn't necessary when you specify Hooker aluminum chloride. The four sizes give you a choice that will meet just about every process requirement:

1. *Extra fine grind* is unscreened, with 90 to 95% passing 40 mesh.
2. *Fine grind* is unscreened, practically all passing 20 mesh.
3. *Coarse grind* is unscreened, 1 mesh and finer. It contains 25 to 35% finer than 20 mesh.
4. *Coarse screened* is the same as coarse grind (No. 3), but is screened to remove 20 mesh and finer.

Before re-ordering your requirements, get the facts on Hooker aluminum chloride. For technical data, just phone the nearest Hooker office listed below, or mail the coupon today.

Need other chlorides? This is only one of several metal chlorides available from Hooker. Chlorinated organics and inorganics are specialties with us; we've been making them for more than 30 years. If you need a special chlorine-containing compound in quantity, we may be able to produce it for you economically. To find out quickly, just phone the nearest Hooker office or write us today.

FOR FAST SERVICE, PHONE:

CHICAGO	CEntral 6-1311
LOS ANGELES	NEvada 6-3826
NEW YORK	MUrray Hill 2-2500
NIAGARA FALLS	6655
TACOMA	BRoadway 1215

HOOKER ELECTROCHEMICAL COMPANY,
15 Forty-seventh St., Niagara Falls, N. Y.

Please send:

☐ Data sheet on Hooker aluminum chloride, anhydrous
☐ Bulletin 100 describing Hooker products and services

Name..... Title.....
Company..... Address.....
City..... Zone..... State.....

HOOKER CHEMICALS

3-1495

From the Salt of the Earth

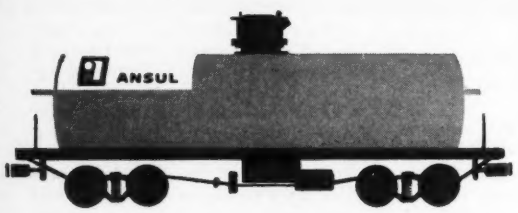
HOOKER ELECTROCHEMICAL COMPANY

NIAGARA FALLS • TACOMA • MONTAGUE, MICH. • NEW YORK • CHICAGO • LOS ANGELES

When inquiring check CP 3939 on handy form, pgs. 2-3

ANSUL

sulfur dioxide



Product Purity. Since 1915, Ansul has been supplying industry with a near 100% pure grade of liquid sulfur dioxide. During these years, Ansul developed a quality control system for the manufacture of sulfur dioxide that assures users a *consistently* pure (99.9%) product—never off grade, always the finest available.

Personalized Service. When you specify Ansul sulfur dioxide, 39 years of experience in compressed gas application becomes available to help solve your installation and use problems. Ansul personalized service also means prompt delivery of emergency orders—insurance against shut-downs caused by a lack of sulfur dioxide.

Research Facilities. For your special problems, Ansul makes available the finest sulfur dioxide research facilities in the nation. These facilities combine with Ansul personalized service to help you use sulfur dioxide effectively, profitably. Write today for more information. ANSUL CHEMICAL COMPANY, Industrial Chemicals Division, Department C-31, Marinette, Wisconsin.

IF your chemical process includes bleaching, acidifying, purifying, fumigating, reducing, preserving, have you fully investigated the advantages of using liquid sulfur dioxide?

When inquiring check CP 3940 on handy form, pgs. 2-3

High-impact polystyrene compound has ten times the toughness of general purpose styrene

Uses: For extrusion or injection molding of products requiring toughness.

Features: Compound is ten times tougher than general purpose polystyrene and has good elongation.

Description: High-impact polystyrene, Styron 480, while offering greater durability, has low specific gravity and water absorption, good chemical resistance, dimensional stability, and electrical properties.

(High-impact polystyrene is a product of The Dow Chemical Co., 1000 Main St., Midland, Mich. . . . or for more information check 3941 on handy form, pages 2 and 3.)

Effective in organic systems, defoamer has long-lasting characteristics . . .

average use dosage is 250 parts per million

Uses: As an acid-stable defoaming agent, particularly effective in organic systems.

Features: Agent is soluble in most common organic solvents and shows excellent lasting qualities, according to laboratory and field tests.

Description: Designated Defoamer PC-1244, the straw-colored liquid is effective in concentrations varying from 5 to 5000 ppm of active ingredient. Average use dosage is 250 ppm. Agent is available in drum and tank car quantities and is supplied as a 40% solution in kerosene.

(Defoamer is a product of Monsanto Chemical Co., Dept. CP, 1700 S. Second St., St. Louis 4, Mo. . . . or for more information check CP 3942 on handy form, pages 2 and 3.)

High nutritional availability, exceptional stability offered by diiodosalicylic acid . . .

compound has an iodine assay of 63 to 65%

Uses: As a convenient organic source of iodine for incorporation in salt blocks and trace-mineralized salt for animal nutrition. Preliminary laboratory reports indicate that compound may become a medicinal source of iodine. Use as radiographic contrast material is suggested.

Features: Compound can be used in salt blocks without danger of leaching and loss of the iodine when exposed to rain or other moisture. It is in-

herently stable against atmospheric oxidation or chemical reaction in salt formulations. Iodine is physiologically available for the protection of thyroid gland in test animals. Laboratory tests indicate a low order of toxicity and high nutritional availability as well as exceptional stability.

Description: 3,5-Diiodosalicylic acid, $C_7H_4O_3I_2$, has an iodine assay of 63-65%. Solubility in water at 25°C is one part in 6000 parts water. Compound is supplied as a white to pale pink fine crystalline powder, 99% through 100 mesh screen. It is stable to air oxidation and iodine loss when pure or in salt formulations, at temperatures up to 100°C for extended periods.

(3,5-Diiodosalicylic acid is a product of Ringwood Chemical Corp., Dept. CP, Ringwood, Ill. . . . or for more information check CP 3943 on handy form, pages 2 and 3.)

Stability built into one-solution Karl Fischer reagent . . .

titer is maintained over periods of one year

Uses: As a reagent for moisture determinations in organic liquids and inorganic solids, and other products such as textiles, dyes, inks, pharmaceuticals, and foods, where volatility, oxidation, or decomposition of sample prohibits use of an oven.

Features: Stabilized, reagent maintains its titer within working limits for at least a year, and yields sharp and stable endpoints in electrometric titrations. It can be opened and placed back on shelf with little loss in titer. Reagent is supplied as a single solution, eliminating need of mixing two solutions prior to use.

Description: Karl Fischer reagent is supplied in pint and quart bottles, each bearing a certificate of titer and stability.

(One-solution Karl Fischer reagent is a product of Fisher Scientific Co., Dept. CP, 717 Forbes St., Pittsburgh 19, Pa. . . . or for more information Check CP 3944 on convenient Reader Service slip, pages 2 and 3.)

Synthetic resins, pentaerythritol, nonionics, plasticizers listed

Detailed tables describe manufacturer's line of synthetic resins, pentaerythritol, nonionic surface-active agents, and plasticizers for plastics. Physical properties are presented in 8-page bulletin.

Bul 997 is issued by Synthetics Dept., Hercules Powder Co., Inc., Dept. CP, 954 Market St., Wilmington 99, Del. When inquiring specify CP 3945 on handy form, pages 2 and 3.

PROGRESS THRU RESEARCH . . . at GENERAL MILLS

Fast, Practical Curing Polyamide-epoxy Resins

Fatty Amines: Top Ore Collectors ☆☆☆☆☆ Fatty Acids Lower Grease Cost

As a maker of pottings, castings, moldings or embedments could you use a resin formulation that cures internally, has negligible shrinkage and requires no toxic, volatile, or explosive curing agents?

Try a blend of General Mills Polyamide and epoxy resins. They are two thermoplastic resins that emerge to give you unique thermosetting benefits.

You may combine General Mills Polyamide Resins and the epoxies to get materials ranging from soft and tacky to extremely hard and tough —merely by varying the ratio of the two resins (Polyamide Resin 115—epoxy ratios of 50/50 to 30/70). In its hardest form, this blend shows a valuable combination of impact strength, adhesion, and toughness. In its softest form, it combines extreme adhesion and flexibility.

Polyamide-epoxy blends form rugged potting and casting compounds with close conformation to mold surfaces, thereby producing moldings with excellent finish. Polyamide Resin serves as both a curing agent and modifier. No extra curing agents of harmful or volatile character are essential. Also no volatile reaction products are produced during curing.

These resin blends cure amber-clear and bubble-free. They have low exotherm (heat of reaction), high dielectric strength (approximately 3000 volts per mil at 60 cycles), and are resistant to water, salt spray, grease, oils, and most solvents and common chemicals.

Large castings (8 pounds or more) are self-curing and need no external heat. Small castings and moldings require some heat for best results. A typical cure for small sections is 10 minutes at 300° F.

Pot life of Polyamide and epoxy resins is longer than for an equivalent mass of monomeric amine-cured resins. Polyamide resins can also be held at high temperatures for long periods without harm, and are stable for long-term storage.

☆☆☆☆☆

General Mills Fatty Amines are being used increasingly as effective collectors for beneficiation of minerals.

The glass cloth laminate sections above are of equal thickness and glass content. Unlike the polyester, left, the Polyamide-epoxy laminate at right cures relatively clear and bubble free. Its affinity and wetting action on glass produce a stronger laminate with superior water resistance.

Alamine (fatty amine) 26, for example, and its corresponding amine acetate (Alamac 26) have proved highly effective for the flotation of such minerals as phosphate, feldspar, mica and spodumene. Recent work has demonstrated potential utility in the iron ore field. That's because these fatty nitrogen compounds are cationic surface active agents which adsorb strongly on silicious, or other negatively charged surfaces.

Alamine 26 and Alamac 26 contain a high proportion of the active primary amine component. Both are soluble in most organic solvents (such as alcohols and aromatic hydrocarbons). The amine is insoluble while its acetate is soluble in water. Both are readily dispersible in water.

For more information on fatty amines for beneficiation of the above ores, mail coupon below.

Grease Manufacturing is evolving, today, into an industry offering specialized lubricants for increasingly complex and expensive machinery. That's why the formulating superiority of General Mills fatty acids is winning out with grease makers all across the country.

Many, for example, favor General Mills Aliphat (fatty acid) 26-B, fractionally distilled tallow fatty acid. Its stearic acid content is high and myristic acid is almost completely removed. Thus, Aliphat 26-B is used for making lime and soda base greases—because its use results in noticeably higher yields.

Glycerine and muscilaginous impurities have been removed. You get up to 5 per cent more reactive materials than in whole fats, faster saponification, fewer off-grade batches, and up to 20% higher grease yields.

SEND THIS COUPON:

PROGRESS THRU RESEARCH

General Mills ☆☆☆☆☆ **CHEMICAL DIVISION**
KANKAKEE, ILLINOIS

Please send me additional information on the General Mills products checked below.

☐ Polyamide Resin 115 (for use with epoxy resins) ☐ Fatty Amines
☐ Fatty Amine Acetates ☐ Fatty Acids (for use in ore flotation)
☐ Fatty Acids for grease-manufacturing

Name_____

Firm_____

Address_____

City_____ State_____

When inquiring check CP 3946 on handy form, pgs. 2-3

need greater color stability and resistance to rancidity in your product?

Specify

Low Iodine Chemifats by ADM

HYDROFOL GLYCERIDES T-57-N
HYDROFOL GLYCERIDES T-57-L
HYDROFOL FATTY ACIDS 410
HYDROFOL FATTY ACIDS 420
ADOL FATTY ALCOHOLS 52

ALL 1.0 MAX. IODINE VALUE

Compare samples of any one of these ADM extra-low iodine content "Chemifats" with similar fat chemicals. You'll find these HYDROFOLS measure up to your greatest expectations in the preparation of products which demand maximum color stability and resistance to oxidation.

Send for full particulars on these as well as the full line of ADM Chemicals from fats. Write for the new 40-page HYDROFOL CATALOG.

Hydrofol

ACIDS • GLYCERIDES • SPERM OILS • ALCOHOLS

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PRODUCED IN ANY QUANTITY

SAMPLES TO SHIPLOADS

Other ADM Products:
Linseed Oil, Soybean Oil, Fish Oil, Paint Vehicles, Vinyl Plasticizers, Foundry Binders, Industrial Cereals, Vegetable Proteins, Wheat Flour, Dehydrated Alfalfa Meal, Livestock and Poultry Feeds

ARCHER • DANIELS • MIDLAND COMPANY
Chemical Products Division • 2191 West 110th St. • Cleveland 2, Ohio

When inquiring check CP 3947 on handy form, pgs. 2-3

MATERIALS

Reactivity of aldehyde group enhanced by the presence of two chlorine atoms . . .

dichloroacetaldehyde undergoes many reactions

Uses: As a chemical intermediate for introducing the $CHCl_2CHOH$ — and 2,2-dichloroethylidene radicals, in syntheses of dichloro analogues of DDT and substituted 1,3-benzodioxans, and to form dichloroacetic acid, dichloroethanol, and derivatives of glyoxal.

Features: Two chlorine atoms enhance reactivity of the aldehyde group and impart bifunctional characteristics to the molecule. Compound undergoes nearly all the common aldehyde addition reactions. In many cases it reacts merely as a negatively substituted acetaldehyde, while under other conditions it forms products related to glyoxal in structure.

Description: Dichloroacetaldehyde, $CHCl_2CHO$, is available as a colorless liquid of 80-85% purity. As supplied, liquid contains about 10% trichloroacetaldehyde. Physical properties include:

Boiling point (°C)	88
Freezing point (°C)	−50
Sp gr (25/4°C)	1.436
Viscosity (cps @ 25°C)	1.3
Vapor pressure (mm @ 20°C)	50
Flash point (open cup, °C)	59

Preliminary studies indicate that compound is similar to chloral in its toxicity characteristics, and extreme care should be used in its handling. Polymerization to a white solid takes place slowly, although suitable inhibitors retard this reaction. Material can be depolymerized by refluxing for two to four hours.

(Dichloroacetaldehyde is a product of Westvaco Chemical Div., Food Machinery & Chemical Corp., Dept. CP, 161 E. 42nd St., New York 17, N.Y. . . . or for more information check CP 3948 on handy form, pages 2 and 3.)

Deals with effect of carbon black as antioxidant in uncured rubber

Monograph deals with oxygen absorption correlation with gelation reaction of unvulcanized carbon black-cold rubber films. Study shows that combined oxygen on carbon black surface plays a significant role in this gelation reaction, and that in a benzoyl peroxide-initiated gelation the direction of black-effect varies with polymer used. Digest-size reprint is 16 pages.

"Oxidation of Unvulcanized Rubber — Effect of Carbon Black" is issued by Binney & Smith Inc., Dept. CP, 380 Madison Ave., New York 17, N.Y. When inquiring specify CP 3949 on handy form, pages 2 and 3.

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the WILLIAMS LINE of

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PURE RED IRON OXIDES

OUR NEW 100 SERIES

--Available in 6 Shades ranging from a Light Salmon Red to a Medium Maroon R-2200, R-2900, R-3200, R-3800, R-4800, R-5800

Compared with our other standard Copperas Reds, the "100" Series is

Brighter in color
Finer in particle size
Lower in oil absorption
Higher in purity
- - at no increase in price!

Broad range of applications includes paints, rubber, building materials, leather finishes, plastics, paper, etc. Let our samples prove the value of these pigments . . . See your Williams representative or write us direct.

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When inquiring check CP 3950 on handy form, pgs. 2-3

Ten organic chemicals now available

Chlorogenic acid, $C_{16}H_{18}O_9$ (m. p. 207°C), has similar pharmacological properties to caffein and related alkaloids.

Dehydroascorbic acid, $C_6H_6O_6$ (m.p. 225° d.), is useful in biological investigations.

Diacetoneglucose, $C_{12}H_{20}O_6$ (m. p. 110-111°), forms monoesters with organic acids and is not split by yeast or emulsion.

1, 2, 5, 6-Dibenzanthracene, $C_{22}H_{14}$ (m.p. 226° subl.), is a carcinogenic of high potency but slow action. It inhibits growth of transplantable tumors, stimulates bacterial growth.

6, 7-Dichlororiboflavin, $C_{15}H_{14}O_6N_4Cl_2$ (m.p. 273−5°), is an antagonist of riboflavin and is used in vitamin and nutritional research.

L-Erythrose, $C_4H_8O_4$ is a syrup which may be converted to lactic acid by heating with HCl.

1, 2-Ethanedithiol, $C_2H_6S_2$ (b.p. 146°), has been tried as an antidote to lewisite and used as a stabilizer for polysulfone resins.

β-Hydroxybutyric acid, $C_4H_8O_3$ a syrup useful in synthesis of higher homologs and in biochemical investigations.

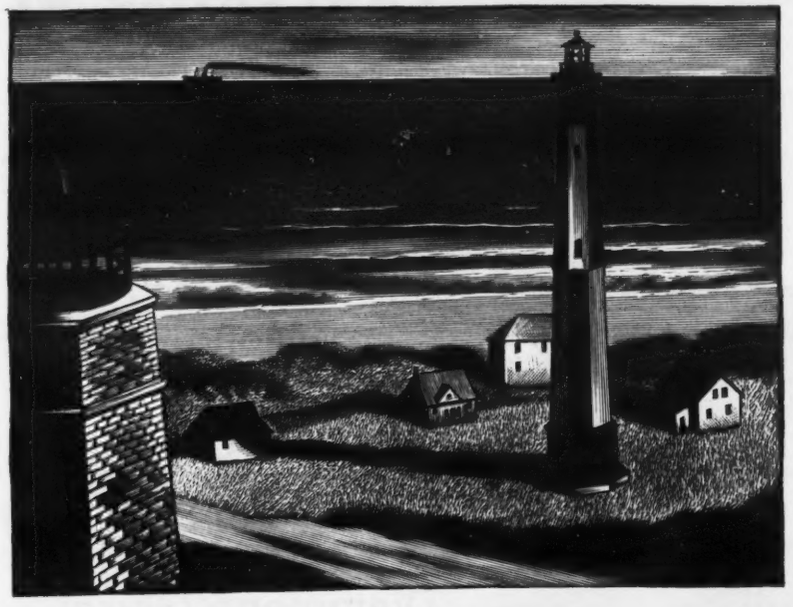
Mesoporphyrin IX, $C_{34}H_{38}O_4N_4$ (m.p. >340°), forms many metallic salts. Compound is toxic to certain paramecia.

Phosphorus nitride, P_3N_5 (d. 910°), is inactive at low temperatures, but is a powerful reducing agent at high temperatures. It forms phosphides when heated with metals to dull red heat.

(Organic chemicals are products of Bios Laboratories, Inc., Dept. CP, 17 W. 60th St., New York 23, N. Y. . . . or check CP 3951 on handy form, pages 2 and 3.)

For more information on product at right, specify CP 3952 . . . see information request blank between pages 2 and 3.

FAMOUS LIGHTHOUSES OF AMERICA



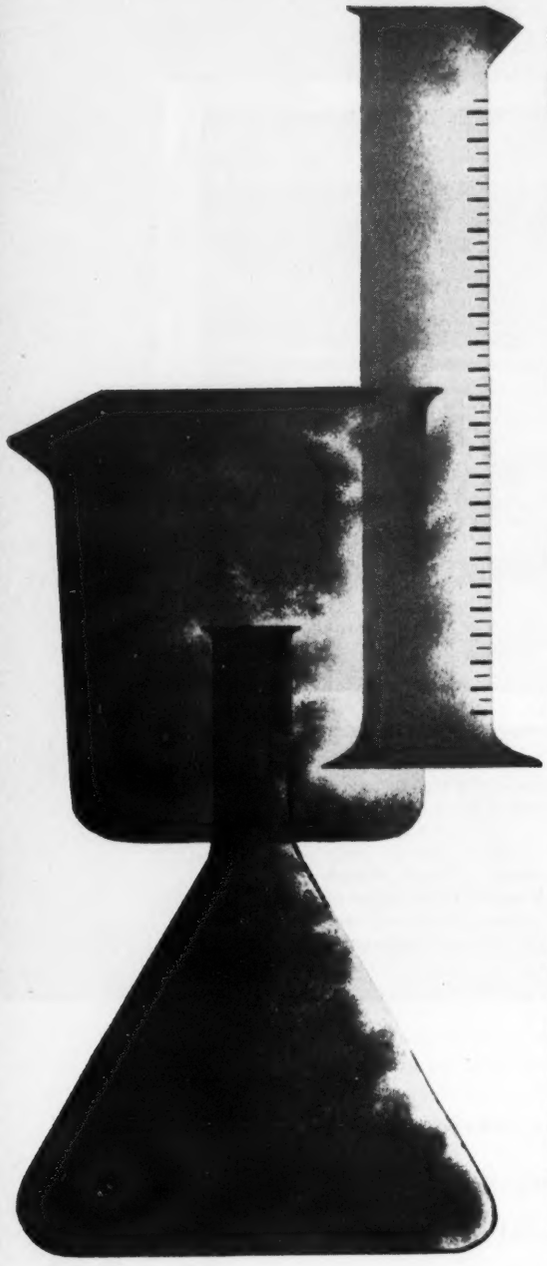
CAPE HENRY LIGHT, located on the south side of the entrance to Chesapeake Bay, was the first lighthouse to be built by the United States. The octagonal tower of sandstone, 129 feet high, was constructed of materials gathered while Virginia was still a colony. This original structure still stands, though it was damaged during the Civil War and is no longer in use. It was replaced in 1881 by the present lighthouse, a cast iron tower 167 feet high, located 337 feet to the northeast.

Pointing the way to progress in the development and use of electrochemicals is the pioneering research of Niagara Alkali Company. Niagara was the first in the country to produce several of these important materials and through research is constantly improving the usefulness of Nialk® Liquid Chlorine, Nialk Caustic Potash, Nialk Carbonate of Potash, Nialk Caustic Soda, Nialk Paradichlorobenzene, Nialk TRICHLORethylene, Niagathal® (Tetrachloro Phthalic Anhydride).

NIAGARA ALKALI COMPANY

60 East 42nd Street, New York 17, N. Y.

USING SOLVENTS?...



...CHECK THE PROPERTIES OF...

Ethylene Glycol Monomethyl Ether

Diethylene Glycol Monomethyl Ether

Ethylene Glycol Monoethyl Ether

Diethylene Glycol Monoethyl Ether

Remarkably versatile solvents, the glycol ethers have a wide range of applications, including: dyeing acetate rayon, adhesive for cellophane, phenolic and epoxy coatings, wood stains. As mutual solvents they are used in the preparation of liquid glass and metal cleaners, dry-cleaning soaps, textile finishing agents, and mercerizing compounds.

Mathieson glycol ethers are available in commercial quantities—drums, tank cars, compartmented tank cars—from our Doe Run plant at Brandenburg, Kentucky. For information, data sheets, and samples, call the nearest district sales office or write today.

Atlanta • Baltimore • Buffalo • Charlotte • Chicago • Cincinnati
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ETHYLENE OXIDE • ETHYLENE GLYCOL • DIETHYLENE GLYCOL • TRIETHYLENE GLYCOL • POLYGLYCOLS • DICHLOROETHYLETHER • ETHYLENE DICHLORIDE • METHANOL • SODIUM METHYLATE • ETHYLENE DIAMINE • HEXAMINE

When inquiring check CP 3953 on handy form, pgs. 2-3

Colorless binder won't discolor when dried, molded, or cured at usual temperatures . . .

compound adheres well to glass fibers, and resists attack by organic solvents

Uses: As a binder for glass mats and molding preforms, and is of particular use in molding light-colored pieces.

Features: Binder introduces no color of its own nor does it discolor when heated at usual drying or curing temperatures. Binder is easily prepared by water dilution. It adheres well to glass fibers and resists attack by organic solvents; therefore binder will not "wash" during molding.

Description: Binder P-812, as received, has the following properties:

Solids (%)	45
pH	4-6
Sp gr (25°/25°C)	1.08-1.09
Dilution limit	Infinite

This acrylic water emulsion forms a hard, colorless, thermoset polymer when heated. It can be sprayed conveniently with standard spraying apparatus; a 2-6% solids solution is recommended. Drying temperatures above 250°F are recommended.

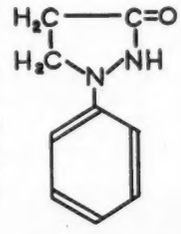
(Binder is a product of The Resinous Products Div., Rohm & Haas Co., Dept. CP, Washington Square, Philadelphia 5, Pa. . . . or for more information check CP 3954, pages 2 and 3.)

Low-toxicity and non-staining activator for photographic developer solutions . . .

compound is potent activator for hydroquinone

Uses: As an activator for hydroquinone in photographic developer formulations.

Features: Compound is one of the least toxic developers known and is non-staining. Highly soluble and working at a low pH, the compound permits preparation of more concentrated hydroquinone developer solutions with good keeping qualities and high developing capacity.



Description: Phenidone is 1-phenyl-3-pyrazolidone, a high-contrast developer. It is five to ten times more potent than metal as an activator for hydroquinone, and is available in commercial quantities.

(Photographic developer is a product of Geigy Industrial Chemicals, Div. of Geigy Chemical Corp., Dept. CP, 89 Barclay St., New York 8, N. Y. Check CP 3955, pages 2 and 3.)

Shows promise as white reinforcing pigment in rubber, plastic

Uses: As a white reinforcing pigment in rubber and plastic formulations, and in paints.

Features: Pigment is of very fine particle size and contributes to physical properties in all synthetic and natural rubbers. It is easily dispersed and possesses excellent storage stability.

Description: Zeolex 23 is hydrated sodium silico aluminate (microlitic zeolite). Physical properties include:

Particle size (mμ)	20-30
Screen residue (325 mesh, % max)	0.1
pH	9.5-10.5
Moisture (% max)	5
Oil absorption (cc/100 gm)	130-140
Refractive index (@ 20°C)	1.55
Sp gr	2.1

(White reinforcing pigment is a product of J. M. Huber Corp., Dept. CP, 100 Park Ave., New York 17, N. Y. . . . or for more information check CP 3956 on handy form, pages 2 and 3.)

Shows optically clear rigid plastic sheets

Series of five optically clear rigid plastic sheets are shown in 12-page illustrated booklet. Including both thermoplastic and thermosetting materials, the plastics possess high optical clarity and will resist wear, abrasion, and weathering. Physical properties are compared on two-page table.

"Optically Clear Rigid Plastic Sheets" is issued by Cast Optics Corp., Dept. CP, 1 Post Rd., Riverside, Conn. When inquiring specify CP 3957 on convenient Reader Service slip, pages 2 and 3.

For more information on product at right, specify CP 3958 . . . see information request blank between pages 2 and 3.

Cyanamid's

No. 11 of a series of advertisements

ACRYLO-NEWS

AERO* Acrylonitrile, a highly stable bi-functional chemical, is finding increasing use as a reactive intermediate. Its versatility is indicated by its use in the preparation of pharmaceuticals, insecticides, surface active agents, and many other useful products as well as by direct application in the broad fields of rubber, plastics and textiles. Its polymers and copolymers can be formulated to add many desirable properties to today's products and to create interesting new products for the future. The following items and abstracts, gathered from many sources, indicate a few facets of current research with this versatile chemical.

☆ ☆ ☆ ☆ ☆ ☆

IMPACT STRENGTH OF A MOLDING RESIN IS GREATLY INCREASED by nitrile rubber. Acrylonitrile-butadiene copolymer may be milled into polyvinylacetal resins to form a hard, tough, thermoplastic product. Articles molded from this resin blend are characterized by unusually high impact strength.

THIOPROPIONIC ACIDS AND ESTERS ARE ANTIOXIDANTS FOR OILS, FATS, WAXES AND SOAPS. These antioxidants are prepared by reacting acrylonitrile with sulfides or mercaptans followed by hydrolysis and esterification. Thiodipropionic acid is useful for preventing rancidification of edible fats and oils.

METHOXYPROPYLAMINE, A *Cyanamid* DERIVATIVE OF ACRYLONITRILE, CAN BE USED FOR EMULSIFYING RESINS AND WAXES. Soaps formed by reacting fatty acids with the amine are particularly advantageous in that approximately constant alkalinity is maintained during the drying of emulsions. Floor finishes, textile finishes and water paints are products in which the amine is effective.

A COMPOSITION BRAKE-BLOCK CONTAINS ACRYLONITRILE-BUTADIENE AS A BONDING AGENT. The copolymer, used as a matrix binder for iron particles, asbestos and other nonferrous products, is vulcanized so that the block is resistant to heat and wear.

GOOD PLASTICIZING EFFECT ON RUBBER-LIKE POLYMERS IS OBTAINED WITH OXYDIPROPIONIC ACID ESTERS. These ester derivatives of acrylonitrile are particularly suitable for imparting flexibility at low temperatures to nitrile rubber and polyvinyl chloride.

(Some or all of the above items are covered by U.S. or foreign patents)

☆ ☆ ☆ ☆ ☆ ☆

Should you wish a more complete bibliography of current literature and new developments concerning acrylonitrile, we shall be glad to place your name on our mailing list.

As the pioneer producer of this vinyl monomer, American Cyanamid has expanded its production facilities to assure users adequate supplies at low price. Write for technical assistance in your acrylonitrile research.

*Trade-mark

AMERICAN *Cyanamid* COMPANY
PETROCHEMICALS DEPARTMENT
30 Rockefeller Plaza, New York 20, N.Y.

Celite Powders provide bulking action

3 to 10 times greater than any other inert mineral filler

POUND FOR POUND, Celite* diatomite powders supply more bulking action than any other inert mineral filler because their cubic volume is 3 to 10 times greater. Celite's unique "honeycombed" structure is composed of microscopic, irregularly shaped particles that won't pack down. In mass they weigh only about 10 lbs. per cubic foot.

That's why Celite is so widely used to add bulk and body to industrial formulations. For example, it extends white pigments in paints and papers . . . it improves dispersion of insecticides and fertilizers . . . it fluffs up dry powders such as household cleansers.

Also, from Celite's "honeycombed" structure comes its great absorptive capacity. This characteristic is profitably utilized to keep powders free-flowing . . . to provide a medium for shipping or storing liquids in dry form. And because of the physical structure of its individual particles, Celite has become the outstanding flatting agent for paints . . . it serves as a mild, non-scratching abrasive for fine polishes . . . it improves the surface appearance of plastics.

Which of the many Celite advantages can you use to build product performance or cut costs? A Johns-Manville Celite Engineer will gladly discuss your problem, without obligation. For his services or more information, write Johns-Manville, Box 60, New York 16, New York. In Canada, 199 Bay St., Toronto 1, Ontario.

*Celite is Johns-Manville's registered Trade Mark for its diatomaceous silica products.

JOHNS-MANVILLE JM PRODUCTS **Johns-Manville CELITE** INDUSTRY'S MOST VERSATILE MINERAL FILLER

When inquiring check CP 3959 on handy form, pgs. 2-3

Thirteen additional chemicals in laboratory quantities

Thirteen additions have been added to manufacturer's line of organic chemicals for research, analytical, and teaching purposes:

4,4′ Bis(2-amino-1-naphthylazo)2,2′-stilbenedisulfonic acid disodium salt, a titrimetric indicator for carbonate determination in water analysis.

4-Hydroxy-3-nitrobenzenearsonic acid, a reagent for tin.

2-(*o*-Hydroxyphenyl)benzothiazole, a reagent for cadmium and copper.

Phthalaldehydic acid, believed useful in many condensations.

4,4′-Biphenylenebis(3,3-dimethyl-1-triazene).

1-(4-Biphenylyl)-3,3-dimethyltriazene.

Bromocyclopentane (Pract.).

2,5-Dihydroxy-*p*-benzenedisulfonic acid dipotassium salt.

3,3′-Dimethoxy-1,4′-biphenyl diisocyanate (Pract.).

Dimethyl nitroteraphthalate.

trans-1,4-Diphenyl-2-butene-1,4-dione (Pract.).

Isatoic anhydride.

5-Phenyl-2,4-pentadienoic acid.

(Organic chemicals are products of Distillation Products Industries, Div. of Eastman Kodak Co., Dept. CP, 755 Ridge Rd. West, Rochester 3, N.Y. . . . or for more information check CP 3960 on handy form, pages 2 and 3.)

Two highly reactive diisocyanates have a low order of volatility, allowing use at higher temp . . .

molecular configuration gives improved strength to resinous materials made from them

Uses: Ability to react with a wide variety of compounds suggests use as an intermediate. Rigid or flexible foams can be produced on reaction with appropriate polyester systems. Manufacture of adhesives, fibers, and elastomers for coating has received attention, as has use in the chemical modification of polyesters, paper, drying oils, and leather.

Features: Compounds react with water, alcohols, phenols, mercaptans, amides, imides, ureas, urethanes, carboxylic acids, and acetoacetic ester. With carboxylic acids, they form an amide link and evolve CO_2.

Advantages distinguishing these compounds are a low order of volatility, minimizing hazards from vapor exposure and permitting use at higher temperatures. Although reactive, presence of a sub-

stituent adjacent to each isocyanate group has a moderating effect, allowing greater latitude in reactions. Spatial configuration of the molecules, consisting of a rigid symmetrical system of two freely rotating benzene rings, imparts improved strength qualities to resinous materials made from them.

Description: TODI (bitolylene diisocyanate) and DADI (dianisidine diisocyanate) are light yellow crystalline solids melting at 71-72°C and 122°C respectively. They are soluble in benzene, toluene, and chlorinated hydrocarbons. Inert solvents must be used for these products as they react with substances having active hydrogen.

As to toxicity, the isocyanates are, in general, primary irritants to skin and mucous membranes. Although there is no evidence of permanent injury after exposure, it is recommended that care be exercised to avoid contact. Well ventilated working areas are recommended, particularly when compounds are used at elevated temperatures. Intraperitoneal injections into mice indicate that TODI is not acutely toxic in doses as high as 1.0 gm/kg. Additional testing is still in progress.

(TODI and DADI diisocyanates are produced in semi-commercial quantities by The Carwin Co., Dept. CP, North Haven, Conn. . . . or for more information check CP 3961, pages 2 and 3.)

Wrapping paper is fungus-resistant when paper stock and coating contain preservative . . .

tests show 0.5 per cent concentration is sufficient

Results of recently-conducted laboratory tests on sodium pentachlorophenate preservative for paper such as used to wrap soap showed that both paper stock and coating need protection.

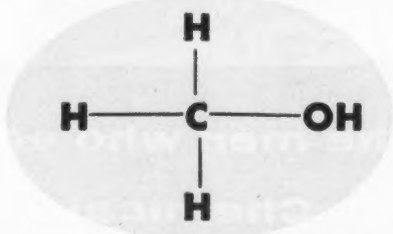
A retention of 0.5% Santobrite (manufacturer's sodium pentachlorophenate) on the dry weight of the paper base stock protected it, and 0.25% on weight of specific coating material applied to this paper protected the coating. Individual tests ran four weeks each and consisted of 1) placing specimens in sterile Petri dish, spraying with mixed spore suspension, and incubating; 2) placing on nutrient agar, spraying, and incubating; and 3) putting specimens in modified tropical chamber and incubating.

Because coating thickness and quantity of starch or other sizing varies from paper to paper, manufacturer suggests 0.50% Santobrite in both base paper stock and coating material. Lab tests have been confirmed by actual mill production of such paper.

(Santobrite paper fungicide is a product of Organic Chemicals Div., Monsanto Chemical Co., Dept. CP, 800 N. Twelfth Blvd., St Louis 1, Mo. . . . or for more information check CP 3962, pages 2 and 3.)

For purity, uniformity and dependability ...Specify DU PONT METHANOL

CHECK THESE RIGID SPECIFICATIONS OF



DU PONT METHANOL

Methanol	99.85% Minimum
Non-volatile content	0.0010% Maximum
Acetone	0.003% Maximum
Hydrocarbon	To Pass Test*
Acidity, as acetic acid	0.003% Maximum
Alkalinity, as NH_3	0.003% Maximum
Carbonizable Substances, A. P. H. A.	50 Maximum
Distillation Range at 760 mm., (A. S. T. M. Method D-268) first drop to dry	1.0°C Maximum Including 64.7°C.
Specific Gravity 25°/25°C.	0.78934 Maximum
Appearance, Clarity	Substantially free from suspended matter & sediment
Color, A.P.H.A.	5 Maximum
Odor	Characteristic and free from foreign odors
Permanganate Test	30 Mins. Minimum

(All percentages on weight basis)
*No clouding when diluted with 2 parts water

Whether you are using methanol as a solvent or intermediate . . . as an extractant, drying agent or in any of the other jobs that only methanol can perform so economically and efficiently . . . it will pay you to investigate and specify the *standard of the industry*—Du Pont Methanol.

Made to rigid specifications by the pioneer manufacturer of synthetic methanol, Du Pont Methanol is guaranteed pure (99.85%) synthetic methanol featuring a high degree of uniformity and dependability from shipment to shipment. When you specify and use Du Pont Methanol, you have the assurance that your supply will be of consistent high quality at all times . . . that variations in your products and processes based on the use of methanol will be held to a minimum.

Why not investigate the use of Du Pont Methanol in your business? We'll be happy to send you more information on this versatile, basic chemical—specifications, properties, suggested uses, etc. Just clip the coupon below or write on your letterhead for your copy of our new pamphlet, "Methanol—The Chemical With 1000 and 1 Uses." E. I. du Pont de Nemours & Co. (Inc.), Polychemicals Department, Wilmington 98, Delaware.

AVAILABILITY—Du Pont Methanol is available nationally through agents, shipped from strategically located stock points in tank cars; tank transports and tank wagons from some locations; and 55-gallon non-returnable steel drums.

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Please send me more information on Du Pont Methanol—specifications, properties, uses, bibliography, etc.—including a copy of your new pamphlet "Methanol—The Chemical With 1,000 and 1 Uses."

Name_____ Title_____

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When inquiring check CP 3963 on handy form, pgs. 2-3

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. . . *readability of content* is fully as important as the editorial content itself. *Unless an article is read, it serves no one.*

. . . to build maximum readership, *of the busy men who manage,* editors must first *take the work out of reading.*

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MATERIALS

Destaticizes plastics, fibers, surface coatings to stop one cause of fires . . .

compounds are non-toxic and do not irritate the skin

Uses: To eliminate electrostatic charges in plastics, textile fibers, paper, and in surface coatings, either during processing or in service, to reduce fire hazards.

Features: Destaticizers can be used to provide either permanent or temporary protection. When incorporated in formulation, compounds give permanent protection. Surface contact of finished product gives temporary static protection. The compounds are non-toxic and do not irritate skin.

Description: Electrosol series has been developed to solve any static problem in conjunction with synthetic resins and fibers and natural fibers.

Incorporation of destaticizer in plastics is done prior to molding or extrusion, usually during milling. Compatibility with plastics is good. About 3 to 5% in formulation is sufficient.

Electrosols form a series of chemical compounds which are not interchangeable. Definition and presentation of specific problems are necessary before correct compound can be recommended.

(Destaticizers are products of Alframine Corp., Dept. CP, 4731 E. 52nd Dr., Los Angeles 22, Calif. Check CP 3964, pages 2 and 3.)

Reduces foaming, carryover in synthetic latex manufacture . . .

antifoam agent is easy to apply, and does not corrode metals

Uses: Control of foam, bubble formation and carryover in synthetic latex manufacture.

Features: Additive reduces foaming with a minimum of undesirable pre-flocculating. In both stripping and solvent recovery operations, additive facilitates latex processing by effectively and economically reducing foaming and carryover. Agent is easy to apply.

Description: Nalco 71-Lx is an amber colored liquid, soluble in aliphatic solvents and in most aromatic solvents. Dosage varies from 0.05 to 0.15%, based on quantity of synthetic latex compounded. It has the following typical physical properties:

Viscosity (cps @ 77°F)	63.8
Weight (lb/gal)	7.56
Cloud point (°F)	64
Flash point (COC, °F)	313

To apply, antifoam is fed to system through a chemical proportioning pump, and may be diluted with water or styrene, as desired. It is non-corrosive to metals.

If temperatures below 65°F are encountered during handling or storage, it may become cloudy. Efficiency of material is not impared if it is reheated slowly to 70-75° for use.

(Antifoam for latex is a product of National Aluminate Corp., Dept. CP, 6216 W. 66th Pl., Chicago 38, Ill. . . . or for more information reader may simply check CP 3965 on the convenient Reader Service slip between pages two and three.)

Effectively stabilizes vinyls against heat and light degradation . . .

especially effective in fire-resistant formulations

Uses: To effectively stabilize clear vinyl compounds possessing fire-resistant properties against heat and light degradation.

Features: Stabilizer functions efficiently to produce a clear flame-resistant stock. Since it also has plasticizing action, it replaces equal parts of primary plasticizer.

Description: Advastab PS-38, a clear organic liquid, has the following specs:

Viscosity (Gardner @ 25°C)	G
Sp gr (@ 25°C)	1.02
Refractive index (@ 25°C)	1.490
Color (G-H)	1
Odor	slight

(Vinyl stabilizer is a product of Advance Solvents & Chemical Corp., Dept. CP, 245 Fifth Ave., New York 16, N. Y. . . . or for more information reader may simply check CP 3966 on the convenient Reader Service slip between pages two and three.)

Gives recipes, physical properties of carbon-loaded rubber

Detailed carbon loading studies in natural and synthetic rubbers are given in detail in data notebook. Recipes for formulations of natural, hot and cold GR-S, butyl, and Buna-N rubbers are given along with graphs showing effect of carbon loading on tensile, elongation, modulus at 300%, hardness, and rebound. Mixing, vulcanizing, and testing procedures are given in appendix.

"Columbia Carbons in Natural and Synthetic Rubbers" is available to rubber compounders and technologists on letterhead request to Binney & Smith Inc., Dept. CP, 380 Madison Ave., New York 17, N.Y.

SWIFT'S RED OILS INVITE COMPARISON!

Characteristics	Oleic Acid No. 905	Red Oil No. 805	Red Oil No. 810	Saponification Grade Red Oil
Titer (°C)	5 Max.	5 Max.	8-10	18 Max.
FAC		7 Max.	7 Max.	21 Max.
Color (Lovibond 1¼" Col.) (Lovibond 5¼" Col.)	10 Y/1 R. Max.	30 Y/3 R. Max.	30 Y/3 R. Max.	
FFA (As Oleic)	98-102%	97-101%	97-101%	95% Min.
Acid No.	195-204	193-202	193-202	190 Min.
Iodine No.	90-96	88-95	88-93	83-90
Saponification No.	198-204	194-204	194-204	193-203
Unsaponifiable	1.0% Max.	3% Max.	2.5% Max.	3% Max.

✔ Not too long ago, Red Oils, like many staple industrial materials, were ordered simply as red oils . . . one or two grades served a wide range of needs. Specifications were of a broad and flexible nature.

Today, to meet the competitive needs of modern industry, Swift & Co. has developed four standard grades of Red Oil.

Check the specifications above and see which product fits your requirements. Because of their *exceptionally good color and color stability* many have found they could use Red Oil No. 805 and No. 810 in place of premium priced products, and here's why:

Made from the finest raw materials available, Swift's Red Oils are produced under highly controlled conditions. A unique low temperature solvent process permits the *selective* extraction of color bodies and other impurities. The manufacturing control made possible by such a process is your assurance of a reliable source for a wide variety of "application pure" Red Oil products.

Yes, for obscure as well as for common application, Swift's Red Oils *invite* comparison. So, next time you buy, don't order Red Oil . . . specify *Swift's* in the grade tailored to your needs. Write for a trial order at quantity price.

✔ Write for new 8 page folder on Swift's Industrial Oil Products

Oleic Acid (Red Oil) • Animal Fatty Acids • Vegetable Fatty Acids • Stearic Acids • Hydrogenated Fatty Acids • Larex (Swift's Lard Oils) • Neatex (Swift's Neat's-foot Oils) • Swift's Sperm Oils • Spermaceti U.S.P. • Monoglycerides • Sulfonated Oils • Textile Processing Oils • Anti-Foam Agents • Glycerine • Tallows • Palmex (for Steel Mills) • Hydrogenated Glycerides.

ONE TRIAL IS BETTER THAN A THOUSAND CLAIMS

Call Swift for INDUSTRIAL OILS and FATTY ACIDS

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USE THIS COUPON FOR FURTHER INFORMATION

Swift & Company, Industrial Oil Dept. O-13
1830 165th Street
Hammond, Indiana

Please send data on the following products:

Name _____ Title _____

Company _____

Address _____

City _____ Zone _____ State _____

When inquiring check CP 3967 on handy form, pgs. 2-3

Buflovak Flakers provide

- continuous operation
- large capacity
- product ready for use

These flakers are used extensively in the chemical industry for producing a flaked or granular material from a variety of products. The molten liquid is applied to a revolving drum, quickly cooled and continuously removed by a stationary knife.

Sounds simple and easy, doesn't it? But the smooth, efficient operation of *Buflovak* Flakers throughout the chemical industry is often the result of careful pre-testing in the Pilot Plant of our *Buflovak* Research and Testing Laboratory.

What equipment is required for the safe processing of toxic or corrosive materials? What are the most effective cooling methods for products of low or high melting point, and all the products in between? What other modifications may be required for the most efficient processing of your product?

All of these questions can be answered by *Buflovak* engineers plus Pilot Plant facilities which are available to help you with any flaking problem.

Send for your copy of Catalog 352 to get complete information about *Buflovak* Flakers.

BUFLOVAK EQUIPMENT DIVISION
BLAW-KNOX COMPANY
1645 Fillmore Avenue, Buffalo 11, New York

BLAW-KNOX

BUFLOVAK PRODUCTS: evaporators • dryers (atmospheric and vacuum) • solvent recovery and distillation equipment • chemical plant equipment • food processing equipment • kettles • fabricated processing equipment • vulcanizers . . . . . plus a complete Pilot Plant for pre-testing processes and products.

When inquiring check CP 3968 on handy form, pgs. 2-3

Agglomerating, heat-hardening process forms . . .

taconite pellets suitable for blast furnace

Concentrated iron ore rolled into ½ inch balls, hardened at 2300-2400°F

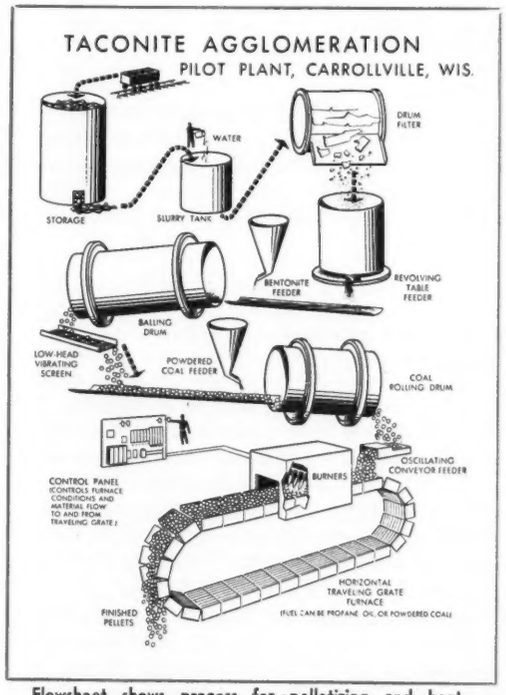
Concentrated taconite is being made into a form suitable for charging to blast furnaces by a pelletizing and heat hardening process. Fine particles of the upgraded iron ore cannot be charged direct to furnaces because the strong up-drafts would blow powdered concentrate right out of the furnace. Increasing amounts of the low-grade ore (20-30% iron) are being mined and upgraded (to 60-65% iron) as the nation's "rich" ore (50-52% iron) deposits rapidly dwindle.

Based on work conducted in pilot plant at Carrollville, Wisconsin, a 1000 ton per day commercial plant has been operating at Babbitt, Minnesota, since February 1954. Another plant, costing about $19 million and capable of producing 12,000 tons of pellets per day, is being constructed at Silver Bay, Minnesota. Mined taconite rock is crushed, ground, and concentrated by either magnetic or flotation methods prior to being pelletized.

Stored concentrated taconite is mixed with a metered amount of water to form a slurry. Rubber-lined solids handling pump transfers slurry to a drum filter where excess moisture is removed from concentrate, leaving about 10% moisture in feed to pelletizing operation. Cake drops on belt conveyor which takes it to table feeder. Concentrates from feeder pass to conveyor which goes to pelletizing drum. Vibrating feeder is mounted over conveyor for metering bentonite to concentrate. This additive acts as bonding agent to reduce possibility of breakage when concentrates are rolled into pellets.

Pelletizing or balling drum is open drum set at slight angle and continuously revolving. Concentrates enter at higher end and pellets leave at lower end. Acceptable pellets are about ½ inch in diameter. Vibrating screen located under discharge end removes those not meeting requirements. Undersize falls through to conveyor which returns them to belt feeding balling drum. Recycled pellets acts as seed and literally keep process going.

Correct size pellets pass across screen and fall on



Flowsheet shows process for pelletizing and heat-hardening taconite concentrates

Pellets discharged from balling drum fall to vibrating screen where undersized pellets are removed and returned to drum

conveyor which passes under a coal feeding device. Powdered coal is added to pellets before they enter coal reroll drum. Pellets go through same action in this drum as they did in balling drum but coal is rolled into the surface of the pellets.

Product is next conveyed to traveling grate of heat-hardening furnace. Balls are fed to grate by oscillating feeder. Burning is performed at 2300-2400°F. Ignition causes molecular change to occur in concentrate which in turn generates heat of its own, amounting to about 40% of that present.

Furnace is so designed that heat retained by pellets is recovered and used for drying and igniting "green" pellets at feed end of machine. Burned pellets are cooled on grate by cold air passing through bed. Breakage of pellets is minimized because of their stationary position on grate as they pass through furnace. Cooled product is discharged, screened, and loaded for shipment.

(Pelletizing and heat-hardening process was developed by Allis-Chalmers Manufacturing Company, Dept. CP, Milwaukee 1, Wisconsin, and Arthur G. McKee and Company, Dept. CP, E. 23rd Street at Chester Avenue, Cleveland, Ohio.)

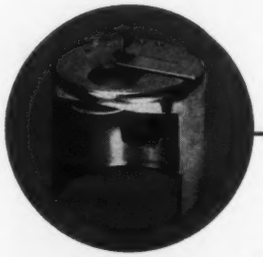
Handbook contains expert advice on radioactive waste disposal

Prepared by Subcommittee on Waste Disposal and Decontamination of the National Committee on Radiation Protection, 31-page handbook discusses factors that should be considered before dumping radioactive wastes into ocean. Also presented are tips for proper use of disposal method.

To obtain National Bureau of Standards Handbook 58, "Radioactive-Waste Disposal in the Ocean", remit 20c direct to Government Printing Office, Washington 25, D. C.

Here's a *Real*

STEAM TRAP PACKAGE

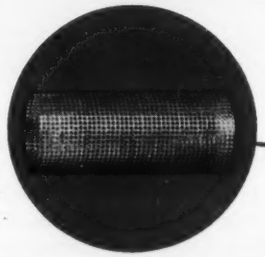


WANT FAST HEAT-UP OF OFF-AND-ON PIPE COILS, HEADERS, UNIT HEATERS, ETC.?

Speed heat-up with Armstrong thermic bucket traps. When steam is first turned on, air is pushed out the large thermic vent—fast! As soon as steam reaches the trap a thermic strip closes the vent, then the bucket functions as a regular bucket. Traps with thermic vent buckets discharge air 50 to 100 times faster than other traps.

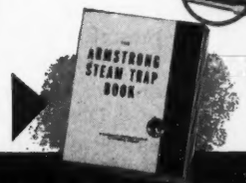
NEED A CHECK VALVE AHEAD OF TRAP?

Just specify Armstrong with internal check valve. No check valve installation, labor or fittings needed. Spring loaded action and vertical position minimize danger of dirt holding valve open. The Armstrong internal check valve is top quality—long lasting.



NEED A STRAINER AHEAD OF TRAP?

Save money with Armstrong built-in strainer traps. They cost less than a separate trap and strainer and save installation time and money. Stainless steel screen lasts a long time.



Get the full facts about all Armstrong traps. Send today for free Catalog J, The Armstrong Steam Trap Book.

ARMSTRONG MACHINE WORKS
880 Maple Street • Three Rivers, Michigan

ARMSTRONG STEAM TRAPS

When inquiring check CP 3969 on handy form, pgs. 2-3

Nuclear reactor planned for industrial research

First nuclear reactor directed toward industrial research is planned by Armour Research Foundation of Illinois Institute of Technology, Chicago. Proposed reactor, designed for 50,000 watts, will cost about $500,000, and will be housed in 8000 sq ft building.

Fuel for reactor will be obtained from AEC. Plans for installation are being submitted to AEC for approval. Officials hope to have reactor in operation by latter part of 1955.

(Information courtesy of Armour Research Foundation, Illinois Institute of Technology, Dept. CP, 35 West 33rd Street, Technology Center, Chicago 16, Illinois.)

Vacuum furnaces turn out super alloys . . .

virtually no contact of hot metal with nitrogen, oxygen, and water vapor

An alloy produced in vacuum induction furnace is said to be capable of withstanding higher temperatures than any wrought alloy now commercially available. Initial output will be from a 400-pound capacity pilot plant furnace. The operation is expected to grow rapidly.

Interested particularly in providing new materials for jet engines, rocket motors, gas turbines, and other devices operating at high temperatures, researchers will soon have available to them a $3 million laboratory structure — practically doubling present facilities and staff.

Metallurgists state that there is a distinct weakening of mechanical properties in fabricated products through unintentional impurities introduced in a given melt under ordinary furnace conditions. Vacuum melting eliminates this.

With high vacuum there is virtually no contact of molten metal with nitrogen, oxygen, and water vapor. Formation of undesirable oxides and nitrides is avoided. Low pressure (1/500,000 of normal atmospheric) and constant pumping during a melt also removes tiny amounts of hydrogen commonly trapped in metals. Slagging and deoxidation practices (which generate further impurities) are unnecessary because little or no slag forms.

More than 1000 exploratory alloys have been produced in experimental, six-pound capacity furnaces. Two larger units, capable of handling 30 to 300 pounds have been operating regularly for more than three years. Metallurgists believe they have developed a commercially feasible process controllable on a large scale.

Most important aspect of vacuum melting is that

How A. O. Smith Texas polymerization REACTORS, HEAT METALLURGICAL VESSELS

THIS installation shows that A. O. Smith service extends far beyond the usual supplying of vessels and exchangers to order. Here, our metallurgical research served to prescribe the chemical specifications used by the customer to improve the corrosion-resistance of specific reactor linings.

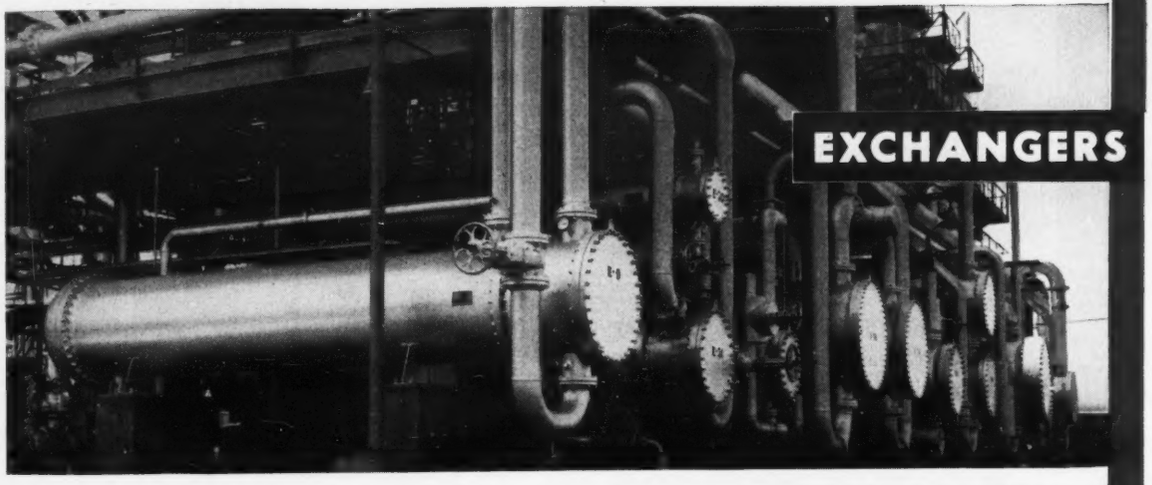
A. O. Smith supplied special pressure vessels, as well as five different kinds of heat exchangers for the phosphoric acid polymerization unit.

This typical example shows why the petroleum, petro-chemical and chemical industries bring their pressure vessel and heat exchanger problems to A. O. Smith.

Investigate A. O. Smith's performance in terms of your own processing needs. Write our nearest office. We'll be glad to give you detailed information about A. O. Smith pressure vessels and heat exchangers, engineering and research.

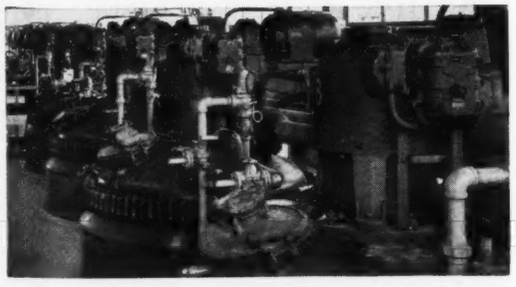
serves refineries

unit uses EXCHANGERS AND RESEARCH



Three A. O. Smith reactors with type 316 ELC lining are the heart of the unit. Designed for operating pressures of 640 psi, the vessels have 102-in. ID . . . are 58 ft. long with 2⅜ in. wall thickness.

The unit has 21 A. O. Smith heat exchangers. These include reboilers, condensers, coolers, heaters and exchangers, ranging in diameter from 15 to 51-in. We make all types of heat exchangers required by a petroleum refinery.



Broader service through Glascote — For more than 20 years, our subsidiary, Glascote Products, Inc., Cleveland, has been serving the process industries. Glascote can supply you with corrosion-resistant laboratory and pilot plant reactors . . . single-shell or jacketed storage tanks . . . double-jacketed condensers . . . columns.

Through research ...*a better way*

A.O.Smith

CORPORATION

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Glascote Products, Inc., Cleveland, Ohio

International Division: Milwaukee 1

When inquiring check CP 3970 on handy form, pgs. 2-3

metallurgists may choose elements that they wish to unite as alloys — unhampered by adverse effects of oxygen and other gases. Metals can be chosen on basis of availability, desired weight or lack of it, resistance to corrosion, ductility, or whatever properties are needed.

Considerable progress has been made in finding ways to use metals of low strategic importance as substitutes for scarce ingredients currently required for high-temperature alloys. Process opens way to use of titanium, zirconium, and aluminum in alloys — impossible under conventional melting methods.

Scrap resulting from cropped ingots and bar ends can be successfully melted, a procedure impossible for certain alloys in conventional practice. Test heats also have shown that charges consisting entirely of scrap produce bar stock equal in physical properties of melted virgin stock.

(Alloys are being produced at Research Laboratory, General Electric Co., Dept. CP, Schenectady, N. Y.)

Offer check-up service for zeolite softener

Check-up service for zeolite water softeners is available. Units are thoroughly checked by field engineer, and findings submitted to owner in SECA (Softener Efficiency Cost Analysis) report. Report shows in exact figures and percentages what kind of job equipment is doing and points out what to do in case of inefficient operation.

(Service is available from Elgin-Refinite, Div. of Elgin Softener Corp., Dept. CP, 180 N. Grove Ave., Elgin, Ill. Check CP 3971, pages 2 and 3.)

You help us decide what articles appear in CP . . .

Yes, you help to determine just what our editorial pages will contain from month to month. Every article appearing in CHEMICAL PROCESSING must first be "qualified" — that is, judged for its importance and idea value to our readers. In qualifying material, we rely heavily on reader response to related developments gathered in the field and published in the past.

And that's where you come in. Your inquiries tell us what materials, processes, ideas, equipment you want most to read about . . . . and we follow through with articles most suitable to your needs . . . So when you inquire, you "vote" for "more articles like this".

THE EDITORS

3000 impulses help keep mid-west refinery "on stream"

THIS big refinery at Lawrenceville, Ill.—like a lot of other important refineries — uses Yarway Impulse Steam Traps.

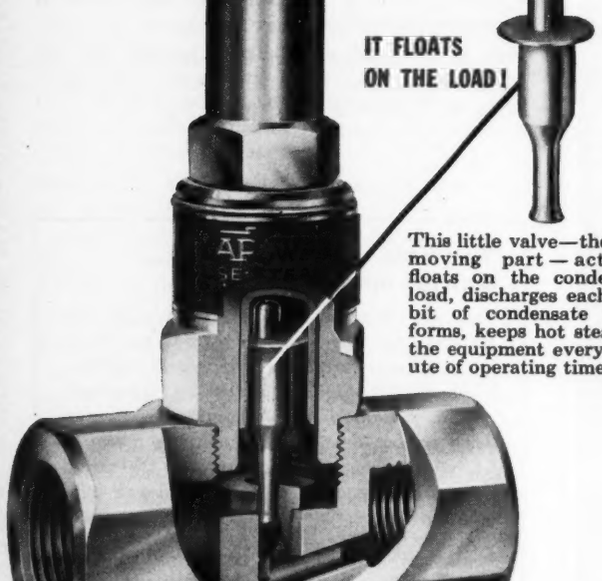
Over 3000 Yarway Impulse Traps are installed on tracer lines and for draining steam headers.

Popular features of the Yarway Impulse Steam Trap are its ability to get equipment *hot in a hurry*—and keep it hot! . . . also its small, handy size—fits in easily in any location; its stainless steel body and working parts; quick installation; easy maintenance; low initial cost.

Another advantage — IMMEDIATE DELIVERY from 250 local distributors, plus quick service from nearby Yarway field engineers.

More than a Million Yarway Impulse Steam Traps have been sold. For a free Steam Trap Selector, write . . .

YARNALL-WARING COMPANY
125 Mermaid Ave., Philadelphia 18, Pa.



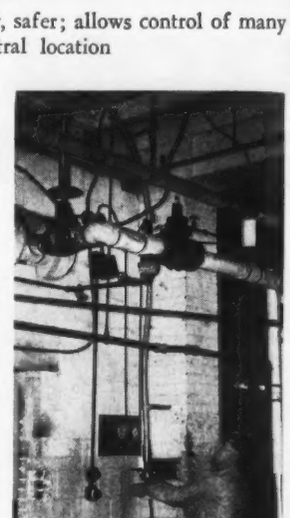
This little valve—the only moving part — actually floats on the condensate load, discharges each tiny bit of condensate as it forms, keeps hot steam in the equipment every minute of operating time.

YARWAY® impulse® steam trap

When inquiring check CP 3972 on handy form, pgs. 2-3

Flexible shafting simplifies remote valve control . . .

operation quicker, safer; allows control of many valves from central location



Flexible shaft operates valve, keeps man off ladder

Flexible shafting, used extensively for remotely controlling valves on ships is now being used for this purpose in industrial plants. Photo shows one example. Formerly, whenever steam valve was opened or closed, operator had to climb a ladder. Flexible shaft with 9" plastic handwheel makes this operation quicker and safer.

Valves may be located in places that are inaccessible to operator if flexible shafting is considered when piping is installed. Also possible is the control of many valves from a central location, allowing more direct and positive action on many intricate production control problems.

(Illustrated 15-page design manual No. 528 is available from Stow Manufacturing Co., Dept. CP, 443 State St., Binghamton, N. Y. . . . or for more information check CP 3973 on handy form, pages 2 and 3.)

Nickel applied non-electrolytically to ferrous, cuprous materials . . .

process similar to "silvering" method used on glass

Wear and corrosion resistant nickel coatings are being applied non-electrolytically to a variety of ferrous and cuprous materials. The process is similar to the "silvering" method used to deposit metal on glass and involves reduction of a nickel salt in a heated solution by means of hypophosphites.

Parts to be plated are first cleaned, much the same as if they were to be electroplated. They are then immediately immersed in the hot nickel solution. Metal parts catalyze solution and cause nickel to be reduced and deposited over all component surfaces that have been wetted.

Plating baths are heated and mechanically agitated

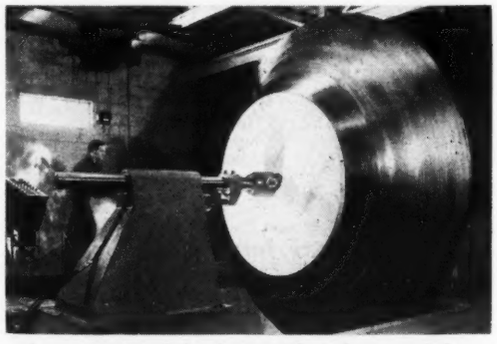
in order to maintain maximum plating rate — about 0.0005" per hr. Coatings are about 93% pure nickel (remaining components are phosphides) and are reported to be as good — and sometimes better — than pure nickel coatings. Hardness of deposits may be varied from 400-600 Vickers to that approaching plated chromium. Adhesion of coatings to brass and steel exceeds 50,000 psi.

Coatings have been used successfully on gears, bearing surfaces, and other components requiring extreme wear resistance.

(Nickel plating process was developed by Chemplate Corporation, Dept. CP, 2671 East 26th Street, Los Angeles 58, California.)

Spin 180-inch width metal with large lathe

Particularly designed to meet need for larger spun shapes in atomic energy plants and industrial air-conditioning equipment, 180-inch diameter lathe is said to be largest horizontal-spindle metal-spinning lathe in the world. Machine makes it possible to spin 180-inch widths of $\frac{3}{8}$-inch thick steel or $\frac{3}{4}$-inch thick aluminum to 72-inch depths. Formerly spinning has never gone over 104-inch widths and $\frac{1}{8}$-inch thicknesses, and, depending upon the metal, over 26 inches in depth.



Large spinning lathe forms 14-foot dome used for air-conditioning equipment

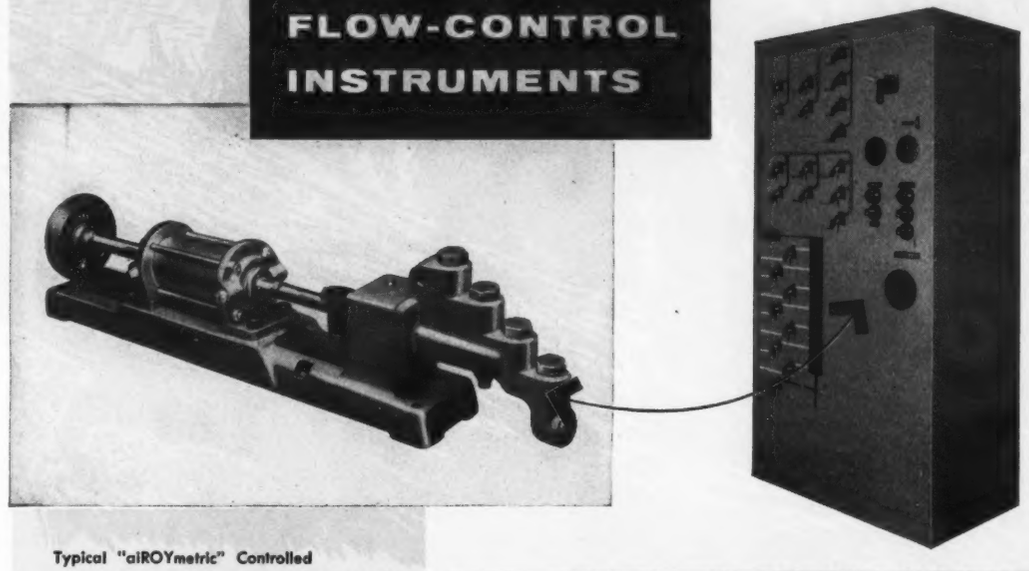
An electric panel controls speed of lathes' 50-hp drive (from zero rpm up), clutches, brakes, and all movement of tail stock.

Lathe is used for armed forces research and development work and for making pilot samples and short-run production lots for private contractors. In addition to handling ordinary metals, lathe spins stainless steels, chrome-moly steels, cupro-nickel alloys, and titanium alloys.

(Machine is used by Metal Spinning Division, Phoenix Products Company, Dept. CP, 4717 N. 27th Street, Milwaukee 16, Wisconsin.)

CONTROLLED VOLUME PUMPS ARE FLOW-CONTROL INSTRUMENTS

This Milton Roy graphic panel provides centralized control and monitoring of 23 air-powered Controlled Volume Pumps to regulate a continuous polymerization process.



Typical "aiROYmetric" Controlled Volume Pump. Air-powered pumps have a capacity range of from .04 to 405 gallons per hour against pressures up to 25,000 pounds per square inch. Capacity can be varied manually or automatically.

MILTON ROY GRAPHIC PANEL CONTROLS CONTINUOUS PROCESS

Flow controllers, ratio controllers and final control elements . . . these are the functions performed by 23 Controlled Volume Pumps in automatically controlling a continuous process.

This graphic panel—installed after full study and pilot plant testing—provides centralized control and monitoring of all 23 Controlled Volume Pumps used in the process. Some of these pumps control the flows and maintain the ratios of process streams. Others are used as final control elements, controlling the flow of catalyst in response to process demand, as dictated by the reactor temperature controller.

Milton Roy Controlled Volume Pumps are flow-control instruments that can *solve your flow-control problems.* Our Engineering Services include detailed recommendations on pumps, process instrumentation, accessories, panel design and construction.

Reference Literature: Write for Application Engineering Data Sheet A-54-2 "Instrumentation of a Continuous Reactor" and Bulletin 1053 "Air-Powered Controlled Volume Pumps."

MILTON Roy COMPANY

Engineering representatives in the United States, Canada, Mexico, Europe, Asia, South America and Africa.

Manufacturing Engineers 1354 E. MERMAID LANE • PHILA. 18, PA.

CONTROLLED VOLUME PUMPS AND AUTOMATIC CHEMICAL FEED SYSTEMS

When inquiring check CP 3974 on handy form, pgs. 2-3

when you're out for bear . . .

. . . don't be under-gunned. If you're out for grizzly or Kodiak you can't do better than a .375 Magnum, and you'll probably use a scope. If you're hunting smaller bear you'll get along well with a lighter-powered 30-06.

There is no need ever to be "under-gunned" in centrifugal processing. Sharples, with a complete line of 7 different types of centrifuges makes it possible to select the one right centrifuge for a particular application —whether for the separation of two immiscible liquids, controlled removal of solids from a slurry, dehydration of crystals, clarification of a liquid or concentration of a solid.

Your assurance of an unbiased recommendation is based on this complete line of Sharples centrifuges—each developed for peak performance in its range of application. You can depend on Sharples.

CENTRIFUGAL FORCE HARNESSED FOR WORK

Sharples Bulletin 1259 describes in concise pictorial form all of the basic types of centrifuges and discusses factually the performance characteristics of each. A copy will be sent at your request.

And in addition . . .

Would rapid, accurate particle size distribution analysis help in your production control or research? Investigate the Micromerograph described in Sharples Bulletin 101.

SHARPLES

THE SHARPLES CORPORATION
2300 WESTMORELAND STREET • PHILADELPHIA 40, PENNSYLVANIA
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Associated Companies and Representatives throughout the World

When inquiring check CP 3975 on handy form, pgs. 2-3

Form finished plastic items with conventional metal stamping press . . .

cycle time is only 10 seconds, no additional operations necessary

Metal stamping companies can now diversify their operations and go into the plastics field. Using a fast conveyor belt process, finished plastic items can be formed on conventional metal stamping presses. No additional operations, such as painting, are necessary. Rigid Geon vinyl plastic sheeting is fed from reels under a bank of strip heaters to the press. Two sets of driven rubber rollers control movement of sheet. Clutch arrangement permits sheet to be fed intermittently. Heaters raise temperature of material to 260-275°F. Cycle time is 10 seconds and stock is cut off during molding operation.

Plastic box is molded from 1/20" thick vinyl sheeting on conventional metal stamping press

Boxes can be molded from 1/20" thick sheeting on standard matched molds having 0.050" clearance between core and cavity, Molds are designed within tolerance of 0.003" overall and 0.001" on cutting edge.

(Molding method is development of B. F. Goodrich Chemical Company, Dept. CP, 324 Rose Building, Cleveland 15, Ohio.)

Greater versatility, faster plating featured in improved sulfamate plating process . . .

wide range of compressive, tensile stresses possible; plates up to 0.007" of nickel/hr

Improved nickel sulfamate plating process boasts following advantages: 1) 75% faster plating, 2) greater versatility, 3) easier control, and 4) harder deposits with less brittleness than conventional sulfamate processes. Commercially tested, the bath has been operating for several months in an electroforming installation and for 10 months in electrotyping foundry.

Composition of bath is 36-44 oz/gal nickel sulfamate, 4-6 oz/gal nickel chloride, 4-6 oz/gal boric acid, and 0.5-1.5 oz/gal SN-1 addition agent. Nickel content is 10 oz/gal and pH is 3.5 to 4.2 (electrometric). Temperatures vary from 75 to 140°F and current densities from 20 to 140 asf.

Bath plates up to 0.007 inches of nickel per hour compared to high of 0.004 inches per hour possible with present baths. Deposits of low internal stress are easily obtained and wide range of specific compressive and tensile stresses are possible. Compressive stresses from zero to -9×10^3 psi and tensile stresses from zero to 18×10^3 psi may be had by varying current density, temperature, and concentration of bath's addition agent.

Pitting is no problem and solutions do not require wetting agent. As an example of hardness obtainable without abnormal brittleness, electrotype plates at printing installation have lasted 50% longer in smooth-stock printing and about 35% longer in carton printing when compared to conventionally-coated plates.

Heating, filtering, and pumping equipment may be made of Karbate, nickel or rubber, and lined with Koroseal or Saran. Stainless steel may be used in spots where bare metal cannot become anodic.

(Development of Hanson-VanWinkle-Munning Company, Dept. CP, 100 Church Street, Matawan, N. J. . . . or for more information check CP 3976 on handy form, pages 2 and 3.)

Forecasts demand for wood, forest products to 1975

Probable demand for forest products from now to 1975, and volumes of wood that would have to be delivered to mills to meet demands, are discussed in 83-page report. Summary of study performed by Stanford Research Institute, Stanford, California, for Weyerhaeuser Timber Company, Tacoma, Washington, report consists of introduction, eight sections, and summary table.

Individual sections are as follows:

1) Economic Growth of the US, 1952-1975
2) Factors Affecting the Long-Range Demand, Supply, and Price of Forest Products
3) The Demand for Lumber
4) The Demand for Pulp and Pulpwood
5) The Demand for Plywood, Veneer, and Building Boards
6) The Demand for Other Forest Products
7) Log and Bolt Requirements
8) Summary of Major Conclusions

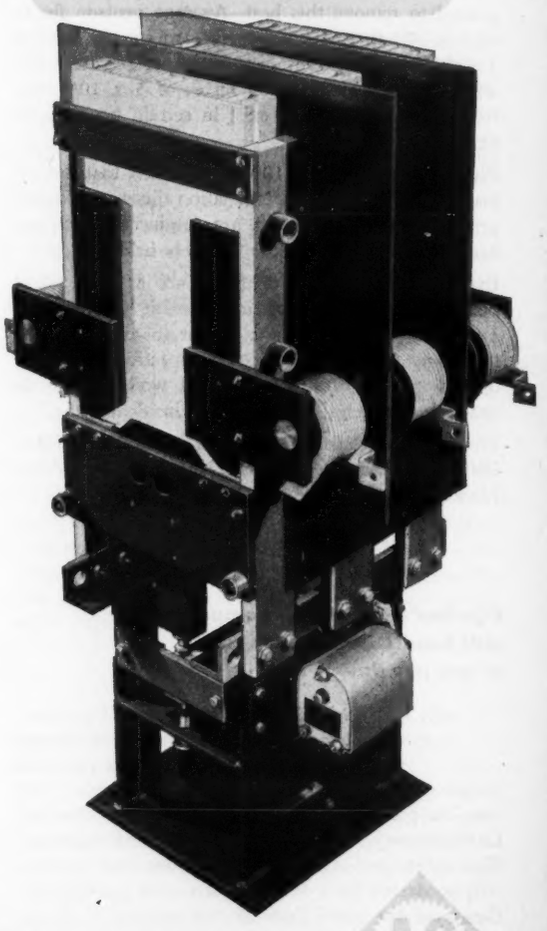
According to the study, bigger markets lie ahead, as result of expected growth of US economy. Competition from wood substitutes will increase. Forestry and logging practices will improve.

"America's Demand for Wood, 1929-1975" is issued on letterhead request to Weyerhaeuser Timber Company, Dept. CP, Tacoma Building, Tacoma 1, Washington.

Built for **SEVERE DUTY**

frequent starting • inching • reversing • dynamic braking

ALLIS-CHALMERS
Type 256
AIR CONTACTOR
FOR 2300 TO 5000-VOLT MOTOR CONTROL



Durability and long-term dependability were given prime consideration in the design of the Allis-Chalmers Type 256 air-break contactor. As a result, the roughest repetitive duty becomes routine — contact operations are actually numbered in the millions with a minimum of servicing.

DESIGN FEATURES

By utilizing a simple vertical motion and double break contacts, troublesome maintenance factors, such as mechanical linkages, turning shafts, shaft bearings and flexible leads, have been eliminated. From the operation standpoint, two gaps in series cut arc voltage in half. Rapid arc extinction is further facilitated by magnetic blowouts at each gap, operating with arc chutes designed to take full advantage of dual blowouts.

In Allis-Chalmers Type H high voltage starters, Type 256 air-break contactors — along with meters, overload relays, current limiting fuses, auxiliary switches — are coordinated to meet heavy duty demands — to provide high capacity interruption and complete protection for man, motor and machine. For complete information see your nearby A-C representative, or write Allis-Chalmers, Milwaukee 1, Wisconsin. Ask for bulletins 14B6410B and 14B7303.

A-4325

ALLIS-CHALMERS

When inquiring check CP 3977 on handy form, pgs. 2-3

Idaho materials testing reactor available to public . . .

isotopes made have higher specific radioactivity than those from other reactors

Specialized facilities of the AEC's materials testing reactor at National Reactor Testing Station, near Idaho Falls, Idaho, have been made available to the public. Constructed primarily to test the effects of intense neutron radiation on materials and fuel elements to be used in future reactors, the MTR can produce isotopes of higher specific radioactivity than the Argonne, Brookhaven, and Oak Ridge reactors, where irradiation services are also available.

Idaho's MTR is a thermal (slow) neutron reactor using uranium enriched in isotope U-235 as fuel, ordinary water as both moderator and coolant, and beryllium as the deflector. Reactor generates 30,000 kw of heat. Over 300 gallons of water per second are needed to remove this heat. Average neutron fluxes of 2×10^{14} thermal neutrons per sq cm per sec and 1×10^{14} fast neutrons per sq cm per sec are available. Peak thermal neutron fluxes of 5×10^{14} neutrons per sq cm per sec exist in certain positions of deflector.

Flux intensity is 10 to 100 times higher than in any reactor now in existence. Irradiation times are reduced proportionately and effects are produced which are barely discernible in lesser neutron fields.

Experimental facilities of MTR are as varied and flexible as possible. Provision is made for bringing a neutron beam outside the reactor for use in crystal spectrometer and a time-of-flight spectrometer (neutron chopper). Most experimental work consists in irradiating materials in positions inside reactor.

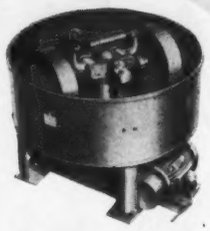
(Information courtesy of Atomic Energy Division, Phillips Petroleum Company, Dept. CP, Idaho Falls, Idaho.)

Pipeline's centrifugal compressor will handle 748 million cu ft of gas per day . . .

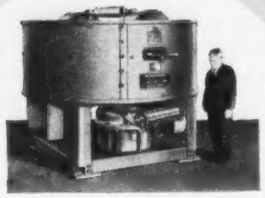
will be driven by 5700-hp two-shaft gas turbine; discharge pressure is 500 psi at 4750 rpm

Single-stage centrifugal pipeline compressor will soon be placed in operation at Northern Natural Gas Company's Macksville, Kansas, booster station. First-stage unit in a four-unit station, the machine will be driven by a 5700-hp two-shaft gas turbine. Designed for rated flow of 748 million cu ft gas per day with suction pressure of 434 psi, compressor's discharge pressure is about 500 psi. Unit's nominal operating speed of 4750 rpm requires 5200 hp.

Main casing and support design have been con-



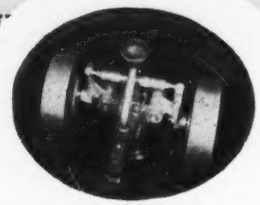
No. 2F MIX-MULLER
6'8" pan dia.
30 cu. ft. capacity
30 H.P. Motor



No. 3-F MIX-MULLER
8'4" pan dia.
60 cu. ft. capacity
75 H.P. Motor

ANIMAL FEEDS . . . IVES . .
ARTIFICIAL S . . T TILES
. . CATALYST . . S . . .
ASBESTOS CEM . . STES .
. . ONES . . . . BOILER . . MPOUNDS
BA . . RY PA . . .
CHEMICAL . . CLAYS . . .
CERAMIC T . . S . . . . CE . . .
CEREAL BI . . . . CRAYON STOCKS . . . . CARBON ELECTRODES
CRUC . . . ES . . . . DRY COLORS . . . . DINNERWARE . .
EN . . . MEL FRIT . . . . ELECTRICAL PORCELAIN .
FE . . . . FOUNDRY SAND . . . . FOOD PRODUCTS
FI . . . TILIZER . . . E BRICK . . .
GL . . . S B . . . CHING . . . .
GRA . . . APHITE . . . PRODUCTS
INSECTI . . . INSULATORS . . . CEMENTS
LUTING MUD . . . . MERCURY . . . . . AMATION
POTTERY . . . . PAINT PASTES . . . . . PLASTICS
PHARMACEUTICALS . . . . POWDE . . . . . PUTTIES
PENCIL LEAD . . . ORCE . . . AIN . . . . PREPARED FOOD MIXES
PAPER C . . . OATINGS . . . . PLASTIC REFRACTORIES
REFRA . . . NG GRANULES . . . . SOAP PRODUCTS
ROOFI . . . . STEATITE . . . ARBIDE
REFRA . . . Y CEMENT . . . DING
SOAP . . . IC . . . ICE
PRODUC . . . . SILICONE . . . N
SPICE BLEND . . . ATER SOFTENERS
SANITARY WARES . . . . TERRA COTTA . . . . . ALS
WHITEWARE . . . . ZINC BLENDS . . . . ZIRCON . . . . . TRICAL

SIMPSON

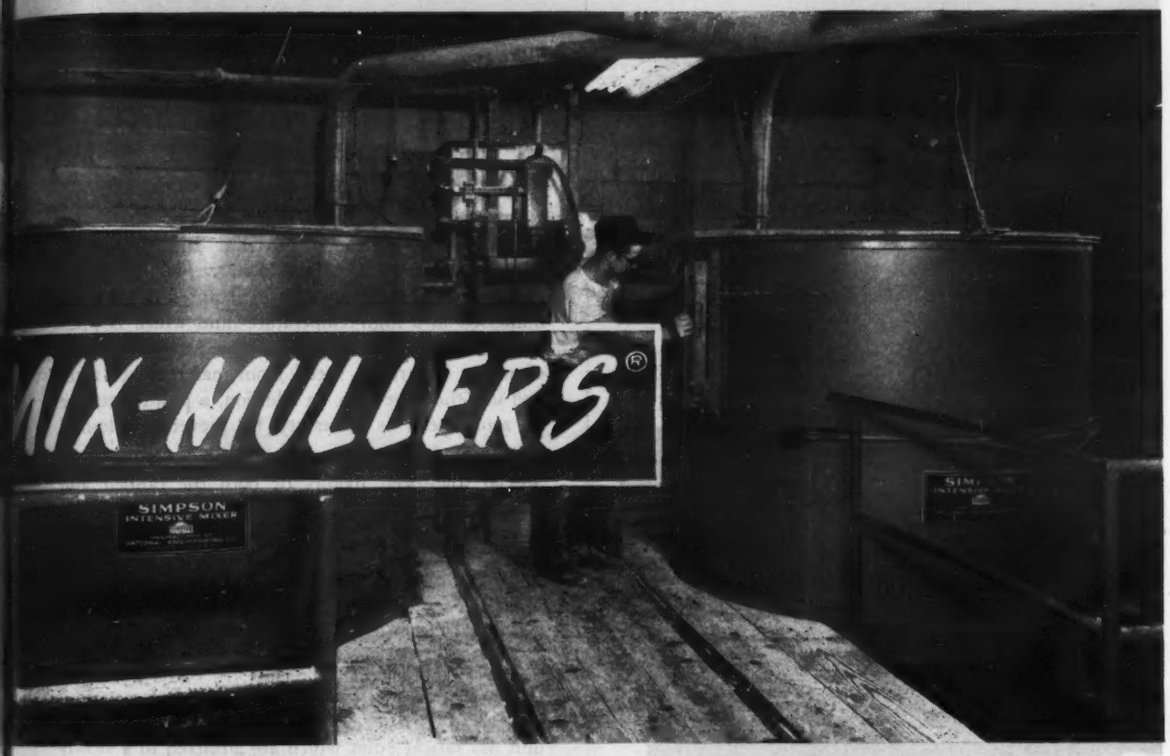


No. 1½ Model F MIX-MULLER
5'4" pan dia.
15 cu. ft. capacity
15 H.P. Motor

No. 1 Model F MIX-MULLER
4'2" pan dia.
7½ cu. ft. capacity
7½ H.P. Motor

PORTO-MULLER
3'3" pan dia.
2½-3 cu. ft. capacity
3 H.P. Motor
(100% Portable)

LF laboratory MIX-MULLER
24" pan dia.
¼-½ cu. ft. capacity
1 H.P. Motor



Six New Models and a *NEW DIMENSION* . . . for your Profit Picture

Does your mixing equipment carry a fair share of the responsibility for adequate profit over materials, manpower and maintenance?

Outdated mixing facilities are a costly and wasteful running mate to an otherwise modern process. Adequate hour-by-hour, day-by-day control over critical mixing formulas can pay dividends in product quality and uniformity. Intimate, thorough blending-in of expensive trace or micro-ingredients can turn a previously wasteful operation into a new selling point for your product . . . new ease to your production.

Simpson Mix-Mullers are an important partner in many key processes . . . bringing *shared economy* to a growing number of diversified chemical and Process Industry applications . . . wherever intimate, controlled blending of costly ingredients requires *real* control over materials preparation facilities.

A New Dimension in Mixing Efficiency

Shown on the page at the left are six New Models of the Simpson Mix-Muller.

Each unit in this new "F" series has been thoroughly plant tested to offer the most for your investment dollar. Providing a *new dimension* in mulling efficiency, the "F" Series Mix-Mullers have spring-loaded Mullers for infinitely variable control over mulling pressures . . . V-belt drive, centralized lubrication; simplified, yet traditional rugged design to help cut maintenance and operating costs to a minimum.

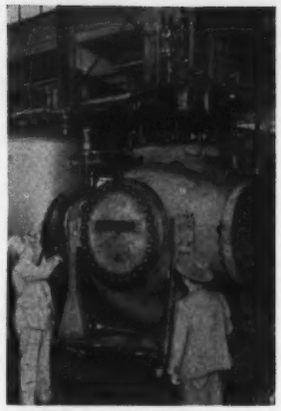
Available in 13 models, in batch capacities of 1/10 to 60 cu. ft., Simpson Mix-Mullers may be equipped to meet every processing need . . . as a reaction vessel . . . for heating or cooling while mixing . . . in stainless or other special metals.

Why not see how modern *controlled* mulling can become a full-time partner in your economy? Call or write for details and remember—mixing is our business . . . our only business for over 40 years.

SIMPSON *MIX-MULLER*® DIVISION
NATIONAL ENGINEERING CO., 640 Machinery Hall Bldg., Chicago 6, Ill.
(Not Inc.)

When inquiring check CP 3978 on handy form, pgs. 2-3

ceived to minimize shaft center-line distortions arising from high pressure in casing. Allowing for maximum working pressure of 1000 psi, casing is designed so that different impellers may be used as flow conditions change in future expansions.



Centrifugal compressor will be used in gas pipeline booster station

Shaft barrel supporting rotor is carried on casing cover and is easily removed through front of machine. Spherical casing provides cavity behind impeller as additional safeguard against accidental seal-oil leakage into gas stream. Impeller is high-strength lightweight construction. Integral lubrication and seal-oil system is independent of driver-lubrication system.

Single pump is used for both seal oil and bearing lubrication. Pump is mechanically driven from compressor shaft and supplies seal oil at pressure somewhat in excess of gas pressure at seal. Elevated tank stores emergency supply at sufficient pressure to supply seal and lubricate bearings during pump failure.

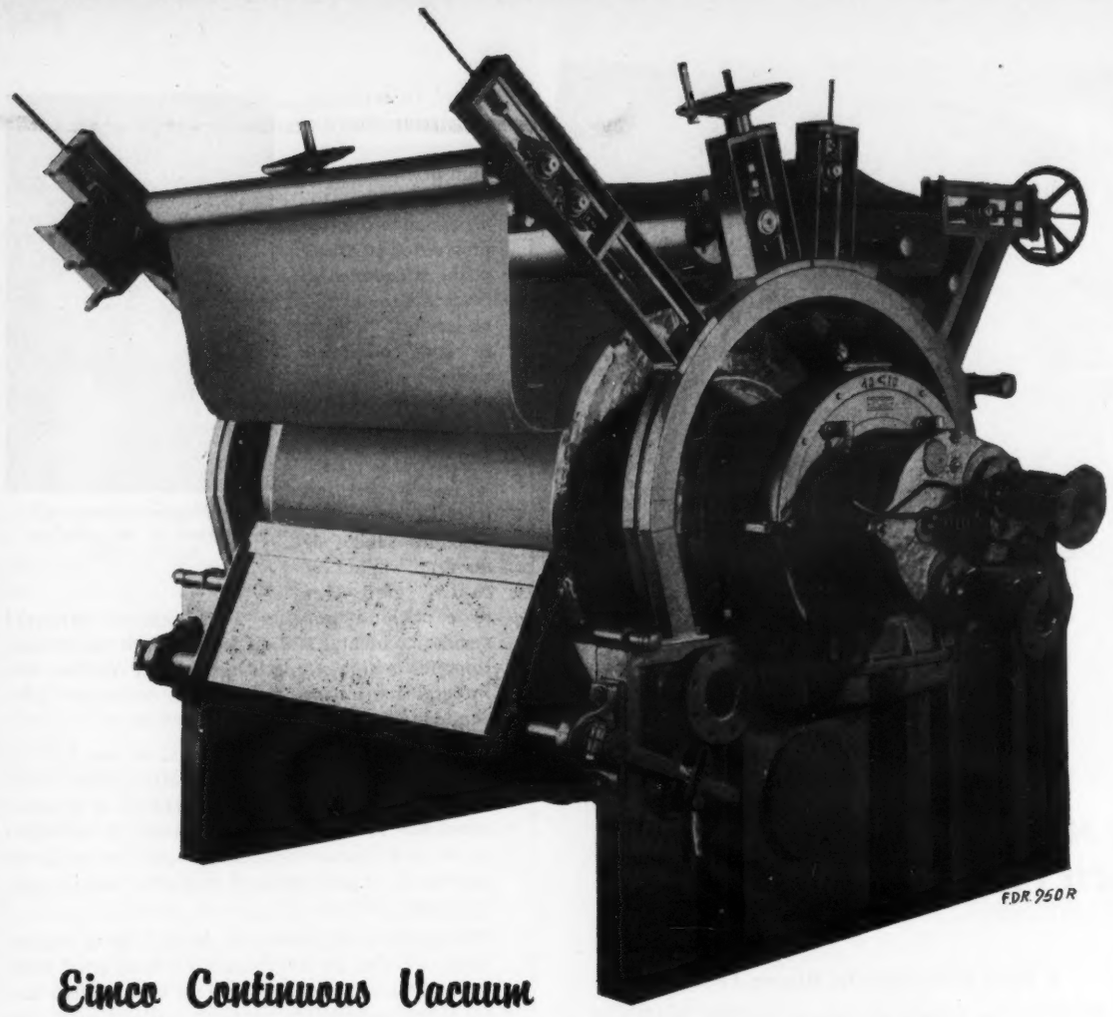
Oil supply from pump is divided by a control valve operated by level signal from elevated tank. Stream running through control valve enters barrel at an intermediate pressure and full pump delivery passes through thrust bearing and inboard journal bearing. No internal bearing mishap can result in starving another bearing.

(Compressor is manufactured by Worthington Corporation, Dept. CP, Harrison and Worthington Avenues, Harrison, N. J. . . . or for more information reader may simply check CP 3979 on handy form, pages 2 and 3.)

Industrial uses of ultrasonics outlined in 27 pages

Recent development in industrial use of ultrasonic energy are outlined in 27-page report. Applications in biology, biochemistry, biophysics and metallurgy are reviewed. Also included are applications such as homogenizing food products and cleaning of dust, mist, smog, gases, and acids.

To obtain "Some Applications of Ultrasonics to Industry", PB 111190, remit 50¢ direct to Office of Technical Services, US Department of Commerce, Washington 25, D. C.



Eimco Continuous Vacuum Filters Using Compression Blankets

Another example of the many types of Eimco Continuous Vacuum and Pressure Filters. Filters of this type have been in use in many plants and provide many advantages where the material to be filtered produces a flocculent solid type cake.

Eimco filters of the type shown above, introduce a wash spray to the cake formation immediately after it emerges from the liquid in the tank and the compression blanket binds the cake to drum within a few inches of the slurry level. The blanket covers the cake to the blow zone above the scraper blade.

This type Eimco filter prevents cake cracking, greatly improves washing and on some types of filter cake, will reduce moisture content in the cake by 8-10%.

Write for more information.

THE EIMCO CORPORATION

Salt Lake City, Utah—U.S.A. • Export Offices: Eimco Bldg., 52 South St., New York City

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EIMCO E 8-80

You Can't Beat An Eimco!

When inquiring check CP 3980 on handy form, pgs. 2-3

IDEAS

Limitations of sealed systems overcome by low-speed rotary motors . . .

units employ simple design, give long service

Severe requirements of sealed pressurized systems, found in nuclear power plant design, place substantial limitations upon electrical and mechanical design features of motors. Relatively high-torque and low-speed performance is required with rotor immersed in a high-temperature fluid which is pressurized to 2000 psi (as an example). Also required of motor is variable speed from maximum to zero, and in either direction. In addition, a positive torque at zero speed is necessary to prevent undesired movement.

Special low-speed motors of both the canned and slip-on stator types have been successfully built for the purpose of producing rotary motion within a sealed pressurized system. Extensive tests have shown that they meet all specifications. Although relatively expensive, motors employ basically simple design principles and give reliable performance over extended periods of time.

Both units are synchronous reluctance motors with a low, variable-frequency power supply. Rotor of each unit has salient poles which are attracted to a slowly rotating stator field. Performance characteristics are essentially the same in both motors, but construction is radically different. While the canned motor employs a thin, non-magnetic can, the slip-on stator flooded-rotor motor uses a tubular frame $\frac{1}{8}$-inch thick, and of controlled magnetic properties. This latter design has been found simpler. Cooling problem is not as great and replacement of stator is easy.

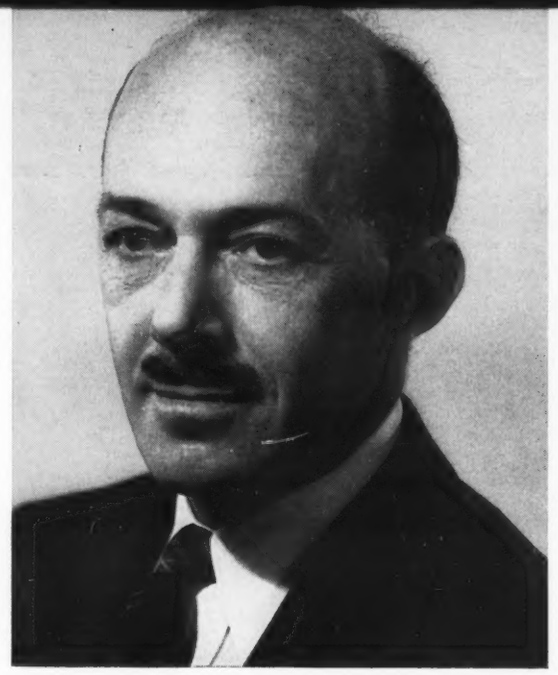
(Material on motors for sealed systems taken from a paper presented before recent AIEE meeting by W. E. McCown, Atomic Power Div., Westingtouse Electric Corp., Dept. CP, Box 2278, Pittsburgh 30, Pennsylvania.)

Bulletin on foundry facilities contains over 20 photos

Foundry facilities for casting gray iron, Meehanite, and ductile iron are pictured and described in eight-page bulletin. Containing over 20 photographs, literature gives range and capacity of foundry for molding and pouring, and shows kinds of castings being produced with maximum economy. Company's engineering and machining services are also discussed.

"Controlled Castings," is issued by The Cooper-Bessemer Corporation, Dept. CP, 200 Thomas Avenue, Mount Vernon, Ohio. When inquiring specify CP 3981 on the convenient Reader Service slip located between pages 2 and 3.

Dr. Wachter received his B.S. in Chemistry from City College of New York in 1927, and his Ph.D. from the University of California in 1930. He joined Shell Development Company in 1932 and became head of the Corrosion Department in April, 1938, at which time he initiated Shell's systematic corrosion research program. Recently, Dr. Wachter's responsibilities have expanded, his present title being "Head of Materials Engineering and Corrosion Department."



the battle against corrosion

DR. AARON WACHTER
President, National Association of Corrosion Engineers

Corrosion in the chemical processing field can be likened to Disease in the sense that corrosion involves diseases of equipment, which take many different forms and degrees of virulence. In handling a case of corrosion, it must be diagnosed, treatment prescribed, prognosis and recurrence considered. Some forms of corrosion are mild and chronic; others may be acute and lethally devastating. In no other field than chemical processing are matters of corrosion more vital and determining in the success of an operation. Nowhere else is equipment exposed to as large a variety of aggressively destructive environments. Corrosion is a common problem in causing failure of process equipment, but even when corrosion is not sufficiently severe to destroy equipment it may cause contamination of materials processed. Trends toward higher temperatures and pressures in chemical processing further aggravate the severity of corrosion problems, and make them even more important in terms of safety and economic losses.

From another point of view, corrosion may be a roadblock in the path of progress. There is little doubt that many chemical processes could be developed if they were not blocked at the outset by some intolerable aspect of corrosion. Some of these difficulties might be overcome at present, but only by use of materials or methods that would be uneconomic. Corrosion, therefore, may be the controlling factor in successful development of new chemical processes. As example of processes that became feasible only after the inherent severe corrosion problems were brought under control, there are the recent accomplishments of synthetic production of ethyl alcohol and of glycerine from petroleum constituents.

Only in relatively recent years has significant consciousness developed of the toll taken from industry by corrosion and of means for reducing these losses. Estimates of these costs to industry have run as high as several billion dollars annually. Vigorous efforts are in progress to reduce these losses. In the forefront of the battle against corrosion is the National Association of Corrosion Engineers whose members are engineers and scientists from the full spectrum of American Industry. Other technical societies are paying increasing attention to corrosion. The result of these activities is an increasing accumulation of information on the causes and prevention of corrosion. Much has been accomplished, but much more remains to be done.

A large variety of versatile weapons are available for the battle against corrosion. These are gradually being perfected and new ones added. They can be separated into five main classes: resistant materials of construction, protective coatings and linings, corrosion inhibitors, amelioration of process conditions, and cathodic protection. No one alone is a panacea for all corrosion ills. Individual cases may require widely different treatments.

Construction Materials — An increasing variety of materials are available for construction of process equipment. What is perhaps more important is that more exact knowledge of the conditions they can withstand is being obtained. A notable advance in recent times was the development of extra low carbon stainless steels enabling fabrication of equipment by welding without introducing a corrosion-sensitive band in the heat-affected zone adjacent to the weld. Titanium is a new commercial metal of considerable interest for handling certain particularly aggressive chemicals. Several alloys have been developed having remarkable resistance to oxidation scaling at very high temperatures above 1500°F) and low creep rates.

Among the non-metallic materials, the "noble" plastics, polytetrafluoro ethylene (Teflon) and related polyfluorohydrocarbon derivatives, have made

(*Continued on page* 101)

Dr. Wachter's authoritative summation of the battle against corrosion launches Chemical Processing's first "feature" section. In the next 52 pages, you will find ideas, equipment, services, technical data to help you in your particular problem.

the weapons

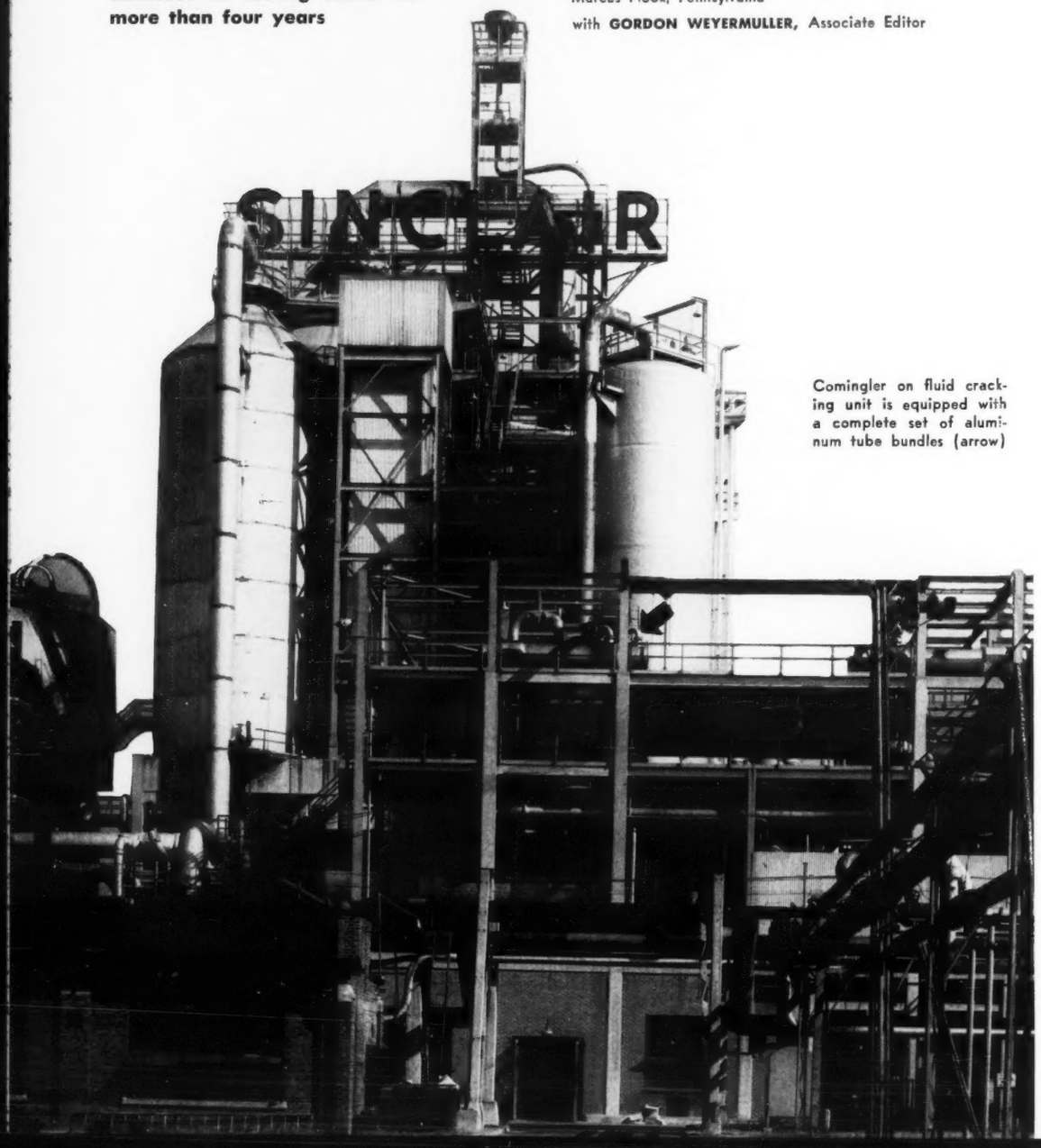
- construction materials
- protective coatings
- corrosion inhibitors
- process revision
- cathodic protection

While other materials corroded in two months or caused fouling, internally-clad aluminum —

combats tube bundle corrosion

Has resisted hydrogen sulfide and ammonia in stream and chlorides in cooling water for more than four years

DAVID STEWART, Chief Technician
Sinclair Refining Company
Marcus Hook, Pennsylvania
with **GORDON WEYERMULLER,** Associate Editor



Comingler on fluid cracking unit is equipped with a complete set of aluminum tube bundles (arrow)

Sinclair had three separate but related problems with tube bundle corrosion. Since company's experience with all of them is interesting, each is discussed in turn, with numbers given to correspond to each of the three respective services

Problem: 1—Red brass tube bundles used on comingler of fluid cracking unit at the Marcus Hook refinery of Sinclair Refining Company failed within two months. Failure was due to corrosion on hydrocarbon side of tubes (exterior) caused by hydrogen sulfide and ammonia in the stream at 150°F and 150 psi.

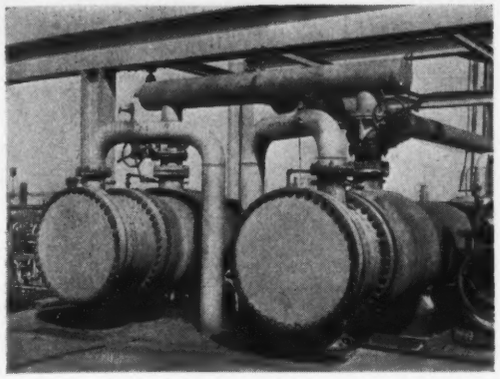
Refinery went to steel bundles which could be expected to have a reasonable life in hydrocarbon service. Steel tubes resisted corrosives in stream on outside but rusted and fouled on the inside from the river water used for cooling. Frequent cleaning was necessary to maintain the heat transfer rate. Cooling water used contains up to 2000 ppm chlorides and has a hardness of 600 ppm, expressed as $CaCO_3$. Amount of dissolved oxygen present is increasing as anti-pollution program becomes effective.

2 — Second service in which Sinclair experienced trouble with tube bundle corrosion was on an ammonia stripper. Water from comingler and other sources is steam-stripped of H_2S and NH_3 as an anti-pollution measure before going to the river. Feed to stripper contains .39% H_2S and .27% H_2S by weight. For this service company started with a steel bundle. It failed in two months due to corrosion on the hydrocarbon side.

3 — In a third service — the aftercooler on thermal cracking stills — steel bundles were also used. Considerable difficulty with fouling was experienced with these units, particularly in hot weather.

Solution: 1 — Early in 1950 one aluminum tube bundle, clad internally with Alclad 3-S, was placed in operation on the comingler on an experimental basis. Alclad 3-S tube has alloy 3-S base metal containing 1.2% manganese and is clad with alloy 72-S containing 1.0% zinc. Aluminum tube bundle was installed in a steel shell, using aluminum tube sheets.

After 18 months, the tube bundle was inspected and found to be 100% OK on the hydrocarbon side. On the inside, the cladding showed about 20% attack. However, the cladding only was attacked, the base metal being intact. Cladding serves as cathodic protection for the base metal. In one



Fouling has been eliminated by use of the aluminum comingler bundles

View of etched cross-section of comingler tube after 18 months service shows how the cladding cathodically protected the base metal

place, some relatively mild corrosion was noted, which was shown to be due to mercury, possibly from a thermometer or U-tube in the plant. As a result of the favorable experience, additional aluminum bundles were placed in service on the comingler to make a complete set of four.

2 — In second service, on ammonia stripper, a complete aluminum tube bundle, including shell and tube sheets, was installed in 1951. In 1954 an aluminum reflux accumulator was also placed in service on the stripper.

3 — In the third service, the thermal cracking stills, an aluminum tube bundle was installed early in 1954.

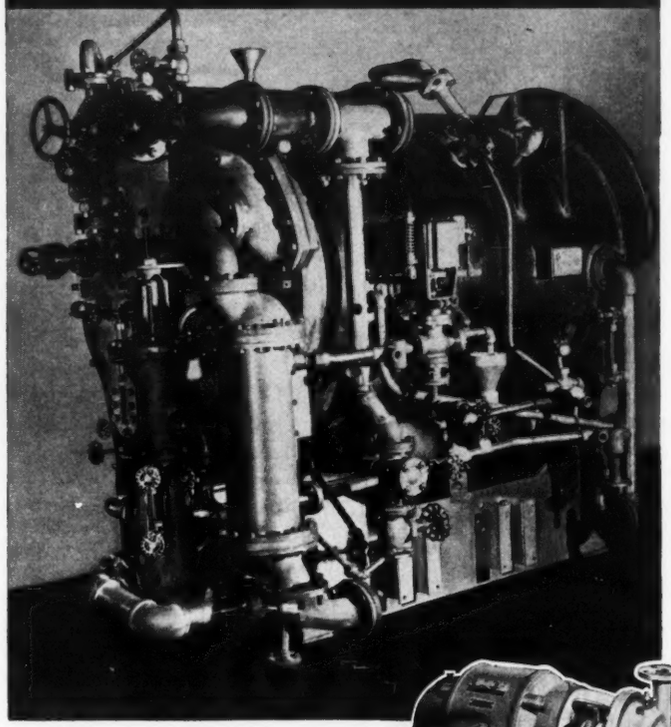
Results: 1 — Original aluminum tube bundle on the comingler is still in good condition after more than four years of operation, while others installed later on this unit are still performing satisfactorily. Fouling on the interior has been eliminated.

2 — In the second application, on the ammonia stripper, two year service was obtained before it was necessary to retube. This is a considerable gain

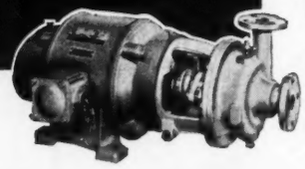
(*Continued on next page*)

CORROSION PROBLEMS evaporate

when you use **AMPCO*** **METAL** *on your tough jobs!*



Salt water evaporator manufactured by Griscom-Russell Co., Massillon, Ohio. Ampco Metal is the principal component of construction.



Ampco Centrifugal Pumps resist corrosion, abrasion, cavitation erosion.

Hot salt water is a corrosion headache in any man's language. And that's why sea-water evaporators manufactured by Griscom-Russell Co. of Massillon, Ohio are made principally of Grade 8 Ampco Metal.

Ampco Metal has exceptional resistance to corrosion from sea water — even brackish water and polluted harbor-water, as well as many other corrosive liquids. That's why it's so widely used in chemical and process applications as well as marine service.

That's not the only reason Grade 8 Ampco Metal was selected for this tough service: It adapts to complicated shapes — it's easy to fabricate with Ampco-Trode* welding wire or covered electrodes. Weight is saved — this evaporator is 10% lighter than previous units, with even further weight reductions possible.

Complete the story yourself! Find out how Ampco Metal can help you save production time, trouble, and money — how it gives you corrosion-, erosion-, abrasion-proof service in hundreds of applications.

You get Grade 8 Ampco Metal in practically any form you require: sheets, plates, extrusions, castings, pipe, fasteners, etc. Check with your nearest Ampco field engineer or send the coupon today for more information.

*Reg. U. S. Pat. Off.

AMPCO METAL, INC.
MILWAUKEE 46, WISCONSIN
West Coast Plant: BURBANK, CALIFORNIA

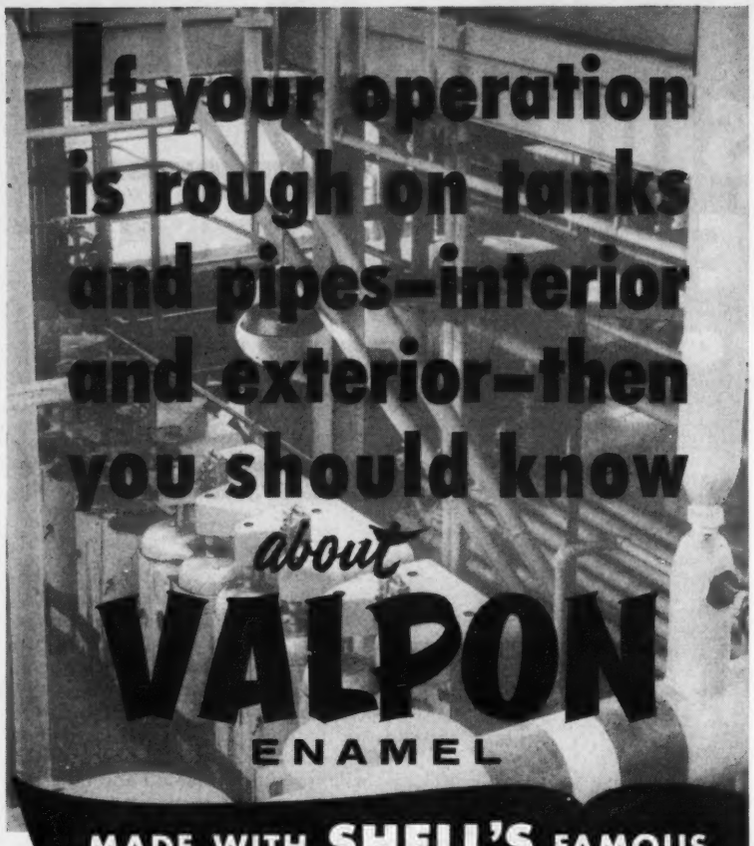
Tear out this coupon and mail today!

AMPCO METAL, INC.
Dept. CP-12, Milwaukee 46, Wisconsin

Send me information of the application of Ampco aluminum bronzes for corrosion-resistant service.

Name.....Title.....
Company.....
Company Address.....
City.....( ) State.....
M-6

When inquiring check CP 3982 on handy form, pgs. 2-3



If your operation is rough on tanks and pipes—interior and exterior—then you should know *about* VALPON ENAMEL

MADE WITH SHELL'S FAMOUS EPON RESINS

Invulnerable to

OILS { ANIMAL, VEGETABLE, MINERAL }

AND CAUSTICS . . .

with a new measure of

resistance to

ABRASION, ACID & ALKALI SOLUTIONS AND CORROSION

In suitable industrial colors and black and white.

If you'd like to know more about Valpon, mail your request on your regular letterhead to the address shown below.

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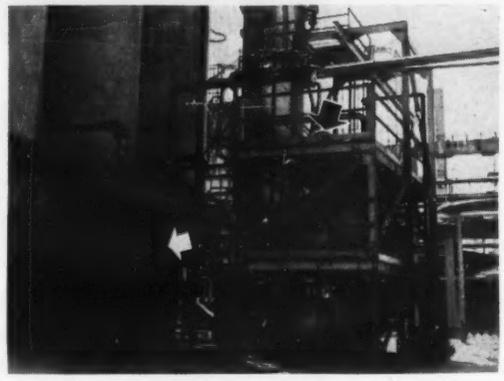
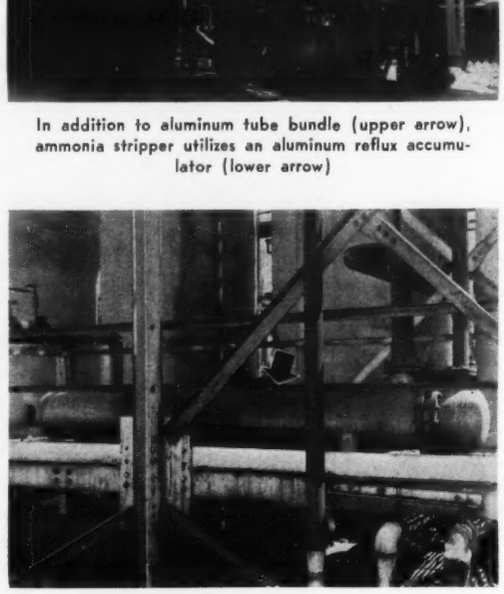
VALDURA HEAVY DUTY PAINT DIVISION

AMERICAN-MARIETTA CO.
101 E. Ontario St., Chicago 11, Ill.

When inquiring check CP 3983 on handy form, pgs. 2-3



In addition to aluminum tube bundle (upper arrow), ammonia stripper utilizes an aluminum reflux accumulator (lower arrow)



As compared to two months service previously obtained, aluminum tube bundle (arrow) on ammonia stripper lasted for two years

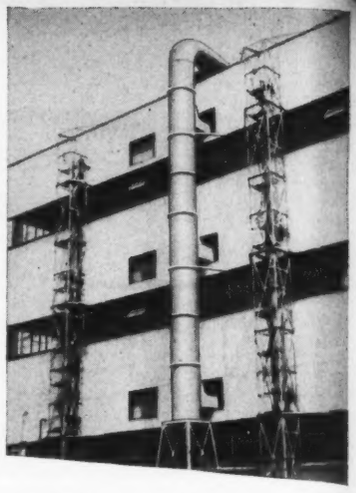
(*Continued from preceding page*)

over the two months formerly obtained.

3 — In the third service, the thermal cracking stills, aluminum tubes were replaced after two months. However, feed to this still contains slop oil from a number of other operations and may have contained a trace of mercury. This aluminum tube bundle will be placed in another thermal cracking still, which has a cleaner feed. Sinclair believes that aluminum tube bundles may prove to be satisfactory even for this rather severe service.

(Aluminum tube bundles and assistance in development work at Sinclair were furnished by Aluminum Co. of America, Dept. CP, 1501 Alcoa Bldg., Pittsburgh, Pa. . . . or for more information check CP 3984 on handy form, pages 2 and 3.)

Be sure to see "Corrosion Keys" — easy-to-use Data starting on page 88



IS A PLA-TANK® STACK THE ANSWER TO YOUR FUME PROBLEM?

Shown here is a light-weight, easily-erected PLA-TANK stack which handles fume exhaust at the new thorium plant of the Lindsay Chemical Co., West Chicago, Ill.

The stack has a 44" diameter, is 69' long including 90° elbow, cross run to fan chamber and riser beyond fan. There are inlets from three floors to handle exhausts from individual tank systems. Stack was prefabricated with flanges for fast installation.

PLA-TANK STACKS may also be the answer to your problem of venting corrosive fumes — inside or out. Consider these many advantages

- . . . manufactured from long-life, resin-bonded glass fiber laminate
- . . . resistant to a wider variety of fumes and temperature than ever before
- . . . not affected by extremes in weather
- . . . light weight, easy to install; need less rigging and support; save handling, freight, shipping charges
- . . . competitively priced; available in diameters to 60"

Let us help you solve your problem the modern way — with PLA-TANK STACKS. Write today for free data sheets.

P-20

THE Chemical CORPORATION
63 Waltham Ave., Springfield 9, Mass.

When inquiring check CP 3985 on handy form, pgs. 2-3

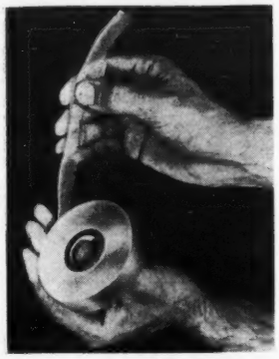
Action of chemicals defied by Teflon tape used for protection . . .

temperature changes won't affect material that is quickly and easily applied

Uses: As a protective covering material on surfaces exposed to corrosive chemicals or fumes.

Features: Tests have shown that this pressure-sensitive tape resists many reactive chemicals, including sulfuric acid, sodium chloride, sodium hydroxide, and hydrochloric acid. Protecive tape is quickly and easily applied and is unaffected by temperature change within the range of −65 to 350°F.

Description: Made from DuPont's polytetrafluoroethylene resin, the tape ("Scotch" brand No. 549) combines properties of Teflon with chemical and heat resistant properties of a pressure-sensitive silicone adhesive.



Tape has tensile strength of 15 psi per inch of tape width

Semi-transparent, blue-gray colored 6-mil tape (5-mil film with 1-mil adhesive) has a tensile strength of 15 psi per inch of tape width, and elongation of 300%. It is available in ½ to 5" widths on 36-yd rolls.

(Corrosion-resistant tape is a product of Minnesota Mining and Mfg. Co., Dept. CP, 900 Fauquier St., St. Paul 6, Minn. Check CP 3986 on handy form, pages 2 and 3.)

Covers "whys" and "hows" of cathodic protection

Covering the "whys" and "hows" of cathodic protection, 12-page catalog section offers complete reference on the mitigation of corrosion of underground and submerged metal structures by the application of an impressed current cathodic protection system. Slanted toward both the management executive and the engineer, booklet contains information on cost of corrosion; economics of cathodic protection; where and when it can and should be applied; facts about impressed current systems and how they should be installed.

Cat Section S-6 500 is available from National Carbon Co., a div. of UCC, Dept. CP, 30 East 42nd St., New York 17, N. Y. When inquiring specify CP 3987 on handy form, pages 2 and 3.

the price was a "give away"

He was looking so hard at the price that he didn't see anything else

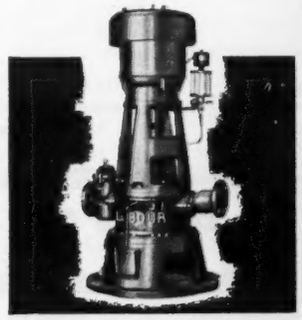
are you doing as well?

A fertilizer manufacturer purchased two LaBour Type G pumps eight years ago. He has bought $184.08 worth of repair parts since. That's $11.50 per pump per year — less than a dollar a month!

This same sort of thing happens in chemical plants all too often. Zealous purchasing saves a few dollars on a pump, and a pump failure costs plenty in time, materials, and lost production.

Check your own records to see what pump repairs have cost. You can easily find what replacement parts have been purchased, and estimate the cost of labor and downtime they involve.

If you have LaBour Type G on the job, you'll find costs mighty low. If you haven't been buying LaBour, get the facts together and show them to your P.A.



ORIGINAL MANUFACTURERS OF THE SELF-PRIMING CENTRIFUGAL PUMP

LABOUR

THE LABOUR COMPANY, INC. ★ ELKHART, INDIANA, U.S.A.

When inquiring check CP 3988 on handy form, pgs. 2-3

before you buy protective coatings . . .

Compare these results

3½ to 4½ MIL THICKNESS using Standard VINYL materials with 1 Prime and 2 Finish Coats

8 MIL THICKNESS using POLYCLAD 933-3 with 1 Prime and 2 Finish Coats

Same number of coats . . . but

More than 3 times the protection

POLYCLAD 933-3

Think what this means to you in dollars and cents! You save almost half on application cost alone.

This economical corrosion maintenance protection is made possible because of Polyclad's high solids content (56%) and high film buildup. Now, for the first time, a vinyl can be applied to a heavy thickness by spraying or brushing without sacrificing acid and solvent resistance characteristics.

Polyclad 933-3 is particularly effective for protection of process building interiors where corrosive fumes are present and light spillage is encountered. It is recommended for maintenance painting on equipment, structural steel, walls, ceilings, tank exteriors and supports.*

Polyclad 933-3 is safe, because it's non-toxic, and will not support combustion. Available in all colors.

Write for prices and complete details, including interesting reprint "cheap paint isn't cheap"

**Rustbond Primer required for all acid and acid solvent areas. Polyclad 948 Primer required for alkaline atmospheres such as ammonia.*

carboline COMPANY

A Division of Mullins Non-Ferrous Castings Corporation

Specialists in Corrosion Resisting Synthetic Materials

333 Thornton Ave., St. Louis 19, Mo.

When inquiring check CP 3989 on handy form, pgs. 2-3

Up to 10 years protection can be given by volatile corrosion inhibitor . . .

wide variety of VPI paper is available

Technical paper points out that steel parts can be protected in a package for as long as 10 years with the use of VPI, the volatile corrosion inhibitor developed by Shell. Simplest VPI wrap, using a kraft paper without any overwrap, gives protection for about three months.

One of the major considerations is the durability of the package. In this respect various grades VPI paper are available which incorporate such features as moldability, waterproofness, greaseproofness, or reinforcement as needed. Light-duty and heavy-duty base papers are provided. Paper containing one gram of corrosion inhibitor per sq ft and two grams per sq ft can be furnished in consideration of package longevity.

(Condensed from paper, "New Horizons in Volatile Corrosion Inhibitors," by Bernard Fischlowitz and Benjamine Levine, Orchard Paper Company, Dept. CP, 3914 Union Blvd., St. Louis, Mo. Paper was presented at the 1954 annual meeting of the National Association of Corrosion Engineers in Kansas City, Mo.)

Highlights zinc as protector

Utilization of zinc anodes in cathodic protection services is thoroughly explained in six-page pamphlet. A brief background of cathodic protection is given and some erroneous beliefs in connection with zinc anodes are corrected. Potential uses of zinc as a protector are also discussed.

Pamphlet entitled "Sound Applications for Zinc Anodes" is issued by The New Jersey Zinc Co., Dept. CP, 160 Front St., New York 38, N.Y. When inquiring specify CP 3990 on handy form, pages 2 and 3.

NOW..."flexible piping"

with TEFLON's heat and corrosion resistance

FLUOROFLEX†-T assemblies combine the outstanding advantages of Teflon* with those of flexible conduit construction. Here's what this gives you:

- **Fluoroflex-T (Teflon compound) tube . . . chemical-proof, non-swelling . . . absorbs vibration**
- **Flexibility that doesn't change from −100° to +450°**
- **Stainless steel braid–for 1000 psi working pressures and for high external corrosion resistance**
- **Compact fittings swaged to armor and tube–won't blow off**
- **Light weight! Space saving! Non aging!**

Write for Bulletin FH-1.

**DuPont trademark for its tetrafluoroethylene resin.*
†Resistoflex trademark for products from fluorocarbon resins.

RESISTOFLEX *corporation*

Belleville 9, New Jersey

When inquiring check CP 3991 on handy form, pgs. 2-3

PHILADELPHIA COPPERSMITHING COMPANY

ENGINEERS
QUALITY FABRICATORS

PROCESS EQUIPMENT FOR THE CHEMICAL AND PHARMACEUTICAL INDUSTRIES

ALL METALS

POPLAR, FRONT & BROWN STS.
PHILADELPHIA 23, PENNA

ESTABLISHED 1898

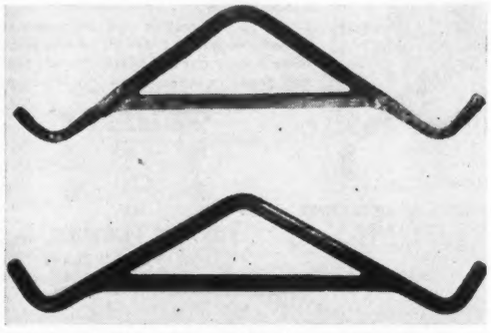
When inquiring check CP 3992 on handy form, pgs. 2-3

Acid bath safety problem solved by stainless hangers . . .

assures working safety, cuts maintenance costs

Problem: Racks and hangers used for supporting materials in hot acid bath at Eastern manufacturer's plant lasted only short time before corrosion so weakened them that they had to be replaced. Not only were replacement costs high, but the hangers presented safety problem as well.

Employes could be seriously burned if hangers should break and contents splash into acid below. Tanks contained 5 to 15% sulfuric acid at temperatures up to 200°F.



Conventional steel hanger (top) is weakened by corrosion after short period of use. Stainless hanger (bottom) shows no sign of corrosion after two years

Solution: Conventional steel hangers were replaced by those fabricated from a high nickel, stainless grade. Known as grade No. 20, material is acid resistant.

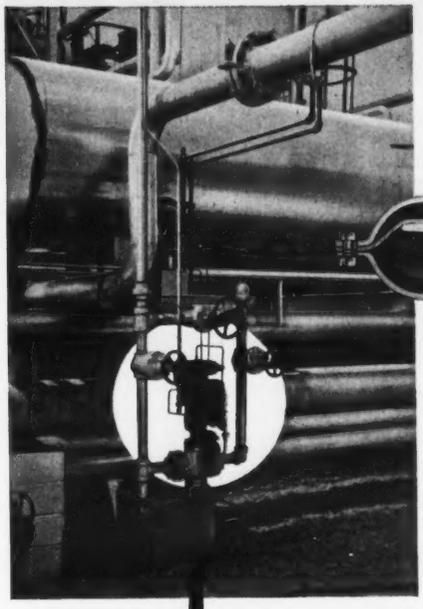
Results: Hangers have been in use over two years and should provide many more years of service. Switching to stainless material has lowered maintenance costs and assured working safety. Firm has adopted it for other parts subject to corrosive action too.

(Acid resistant stainless No. 20 is product of The Carpenter Steel Co., Dept. CP, 1937 Palmer St., Reading, Pa. Check CP 3993, pages 2 and 3.)

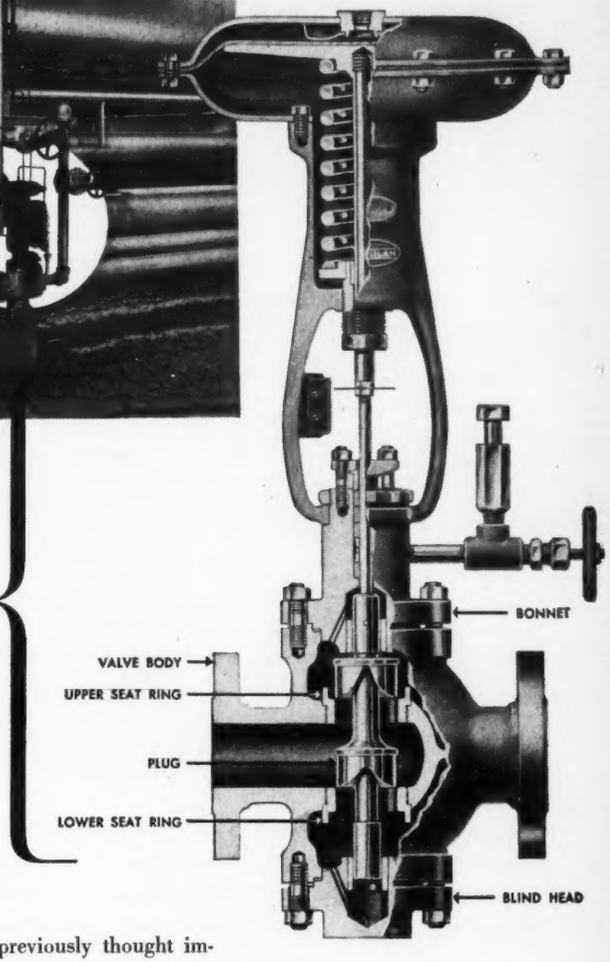
Convert rust to primer, dodge sandblasting

Description and application data for orthophosphoric-and-dichromate primer are included in two-color, four-page bulletin. Text explains how priming material converts rusted surface to hard, primed, gripping surface ready for painting.

"You've Found the Answer . . ." is issued by Rusticide Products Co., Dept. CP, 3125 Perkins Ave., Cleveland 14, Ohio. When inquiring specify CP 3994 on handy form, pages 2 and 3.



6 vital parts in this control valve are made of corrosion-resisting Monel. The six cast parts are produced for the Mason-Neilan Regulator Co. by the nickel alloy specialists in Inco's own foundry. This valve handles corrosive fluids at temperatures up to 300°F. and pressures up to 250 psi.



For controlling hot corrosives under pressure

. . . Cast Monel® gives you the extra strength and corrosion resistance you need

Inside this control valve is the solution to a kind of problem that may be troubling you, too.

This control valve regulates the flow of hot corrosives under pressure. To get long, trouble-free service in applications where Monel is selected as most suitable for the six critical cast parts that come in contact with the corrosives, Mason-Neilan uses Inco-Cast Monel.

Inco-Cast Monel gives extra corrosion resistance even at elevated temperatures. It is as strong as cast carbon steel and harder than many other nonferrous alloys.

Many parts that manufacturers like Mason-Neilan previously thought impractical to produce in Monel, Nickel or Inconel® have proved sound and dependable when made by Inco's casting specialists.

You no longer have to put up with castings that fail prematurely because of destructive conditions. Instead, you can count on Inco-Cast Monel to outlast ordinary materials in centrifuges, agitators, impellers, fittings, and pump parts.

Let Inco help you with problems in critical parts that must withstand destructive service conditions. And for technical information on cast Monel and its unusual combination of properties, write today for a free copy of *Engineering Properties of Cast Monel.*

The INTERNATIONAL NICKEL COMPANY, Inc.
67 Wall Street New York 5, N. Y.

INCO TRADE MARK **Nickel Alloys**

Inco Castings

Sand, Centrifugal, Precision

When inquiring check CP 3995 on handy form, pgs. 2-3

Are you using wire cloth or wire cloth parts which must be corrosion resistant? Are the service conditions in your plant really tough? If you have a problem selecting the proper anti-corrosive alloy, Newark Wire Cloth may have the answer.

Available in all corrosion resistant metals, Newark Wire Cloth is accurately woven in a wide range of meshes, ranging from very coarse to extremely fine.

If you have a wire cloth problem involving corrosion, please tell us about it . . . we may have the answer.

NEWARK for ACCURACY

A complete line of woven wire cloth and wire cloth parts in all malleable metals.

Send for Catalog E

Newark Wire Cloth COMPANY

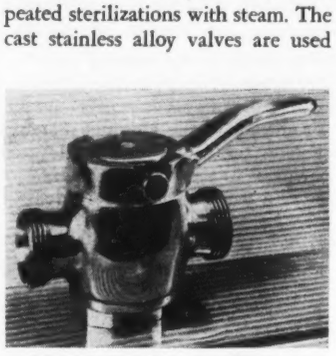
351 VERONA AVENUE • NEWARK 4, NEW JERSEY

When inquiring check CP 3996 on handy form, pgs. 2-3

Cast high alloy valves halt contamination at Chas. Pfizer . . .

withstand dilute sulfuric acid and sterilizations

In addition to dilute sulfuric acid, cast high alloy plug valves in use at Chas. Pfizer & Co., Inc. resist repeated sterilizations with steam. The cast stainless alloy valves are used



Ease of cleaning is an advantage of plug valves similar to this one in use at Chas. Pfizer

in process lines used in manufacturing Terramycin. Prevention of product contamination and ease of cleaning have been found to be among the outstanding advantages obtained from the valves.

Valve is available in three-way type as well as two-way.

(Information was furnished through courtesy of Alloy Casting Institute, Dept. CP, Mineola, N. Y.)

(Plug valves are product of Tri-Clover Div., Ladish Co., Dept. CP, Kenosha, Wis. Check CP 3997, pages 2 and 3.)

Carries 73% hot caustic in nickel-lined tanks . . .

SS Marine Dow-Chem custom-built to carry corrosives

Caustic soda, heated to a temperature of about 230°F to prevent solidification, is carried by the SS Marine Dow-Chem in four specially designed nickel-clad tanks. The ship, custom-built to carry liquid chemicals, has a 5 million gallon capacity and is equipped to handle

CHECKED *Your* ARMOR *LATELY?*

Armor was worn to protect and when it didn't the warrior was a "dead pidgeon."

It's no good to think you're protected only to learn you've an exposed flank. When you don't know for sure that the inside of precious tanks are protected against corrosion you're flirting with disaster in one way or another. Be sure to use JET-KOTE, furane resin.

We would like to explain JET-KOTE to you. Here's a surface protector with outstanding qualities. It's dark black in color consisting of 100% liquid furane resins. Sets chemically at room temperature to one of the hardest, impervious coatings known to man.

Check your operation and see where this remarkable product will fit in—remember, there is only one JET KOTE. We are ready and eager to consult with you if you will telephone or write.

JET KOTE F

DESCRIPTIVE LITERATURE AVAILABLE ASK FOR "M"

Phone CHapman 5-3526

FURANE PLASTICS, INC.
4516 Brazil Street
Los Angeles 39, California

When inquiring check CP 3998 on handy form, pgs. 2-3

RM RESISTANT MATERIALS

Specialists in all
RESISTANT PIPING MATERIALS
to your specifications

Exclusive National Sales Agents for American Hard Rubber Company's

ACE PARIAN
(Polyethylene Plastic)
CHEMICAL PIPING

Perfect combination—Ray Miller's knowledge of corrosion-resistant products and American Hard Rubber Company's century of experience! Ace Parian is a tough, odorless, non-toxic Polyethylene compound—light weight and excellent impact strength even at sub-zero temperatures. Rigid piping ½" to 2"; large line of fittings and valves specifically designed to meet the requirements of the paper, pharmaceutical, food, beverage, plating and chemical processing industries. Write for bulletin.

Territories Available for Distributors and Sales Agents — Inquiries invited

RAY MILLER CO.
4240 KANAWHA T'PK., SO. CHARLESTON, W. VA.

When inquiring check CP 3999 on handy form, pgs. 2-3

many corrosives (page 66, CHEMICAL PROCESSING for Sept.).

However, due to the high corrosion and embrittlement factors present in handling this hot caustic, pure nickel and nickel-clad steel were specified for every piece of equipment coming in contact with it.

These four tanks, located near the ship's stern, are constructed entirely of 10% nickel-clad steel with pure nickel weldments. Coils for heating the caustic, as well as pumps, valves and piping used in loading and unloading the liquid are of pure nickel or are nickel-lined.

Owned by Marine Transport Lines, Inc., New York, the ship is chartered to Dow Chemical Company, and will operate between Dow's Freeport, Texas division and Gulf and East Coast ports.

(Further information on nickel can be obtained from The International Nickel Co., Inc., Dept. CP, 67 Wall St., New York 5, N. Y. . . . or check CP 4000, pages 2 and 3.)

(Nickel-clad steel is product of Lukens Steel Company, Dept. CP, Coatesville, Pa. Check CP 4000A on handy form, pages 2 and 3.)

Pertinent information on resistant packings

Especially designed for chemical and process equipment, packings and gaskets described in six-page folder are made of asbestos treated with Teflon. Materials discussed are virtually unaffected by corrosive chemicals and active solvents. Folder gives detailed information on each of several kinds of gaskets and packings available.

"Chempac Packings and Gaskets" is issued by Johns-Manville, Dept. CP, 22 E. 40th St., New York 16, N. Y. Specify CP 4001, pages 2 and 3.

For more information on product at right, specify CP 4002 . . . see information request blank between pages 2 and 3.

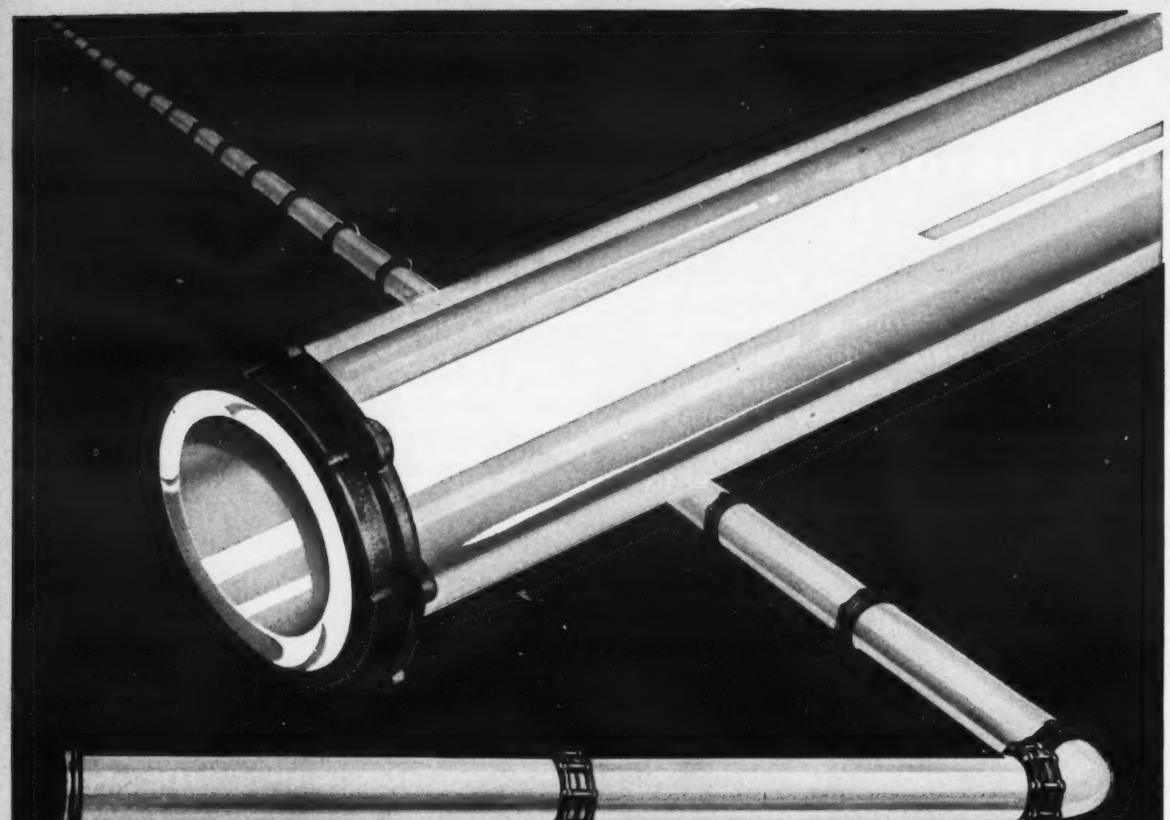
OUR CUSTOMERS KNOW HOW TO Relax!

And we're mighty proud of it. For they've learned through experience that Cooper Alloy stainless steel castings, valves, fittings and accessories can be relied upon when the going is rough. They've learned to relax after they turn their tough corrosion or fluid control problems over to our staff of specialists — and to let us do the worrying for them.

If you've been taking corrosion problems home at night, why not give us a chance to help! The Cooper Alloy reputation was built on quality products — Use them with confidence and relax.

COOPER ALLOY
CORPORATION • HILLSIDE, N.J.

"Stainless Steel Products—custom castings, jet engine rings, valves, fittings, accessories."



For some applications ONLY CHEMICAL CERAMICS *will do*

For only chemical ceramics will resist all acids, alkalies and all solvents (with the exceptions of fluorides and hot caustics). White chemical porcelain, in particular, offers important processing advantages. In addition to its chemical inertness, white chemical porcelain is completely non-toxic and non-contaminating. Its smooth glazed surface makes cleaning a matter of minutes. It can be fabricated in one-piece construction into vessels of practically any shape and in sizes from a thimble to a thousand gallon tank. Many items of equipment, such as pipe, valves, fittings, sinks, filters and storage vessels are standard items carried in stock and ready for immediate shipment. Other items can be fabricated on short notice.

The United States Stoneware Company has been one of the world's principal producers of chemical ceramics for more than ninety years. Continual research and improved manufacturing techniques give today's chemical ceramics characteristics far superior to those of even a few years ago: better heat-shock resistance, higher mechanical strength, closer dimensional tolerances.

Better take a fresh look at chemical ceramics. It may pay you well.

PRODUCT OF U.S. STONEWARE

PROCESS EQUIPMENT DIVISION

499-D

Other Corrosion-Resistant materials manufactured and fabricated by U. S. Stoneware and its affiliated companies, include: TYGON Plastics, Duralon Resins, natural and synthetic rubber products, lead-lined equipment, adhesives and organic bonding agents, acid-brick and cements, and sintered metallic oxides.

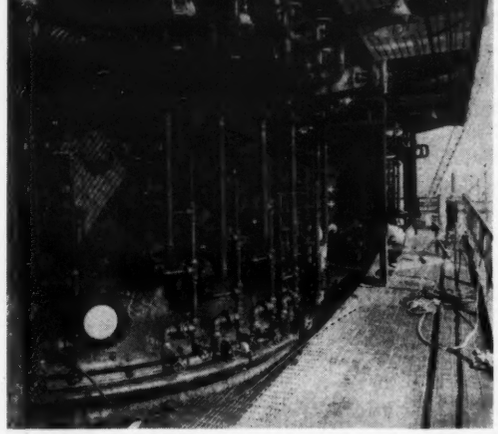
When inquiring check CP 4003 on handy form, pgs. 2-3

Sulfuric acid concentrator capacity boosted 25-35% with tantalum bayonet heaters . . .

corrosion-resistant units improve heat transfer, require less space

Problem: Due to the brittleness of the elements, heaters used on Simonson-Mantius sulfuric acid concentrators made by National Lead Company had shorter life than was required. Since heat transfer of the heaters in use was low, a considerable number was required for each concentrator.

Solution: Company installed multiple tantalum bayonet heaters on the sulfuric concentrators. Heaters are used for handling dilute, medium, and concentrated sulfuric acid. Maximum strength of



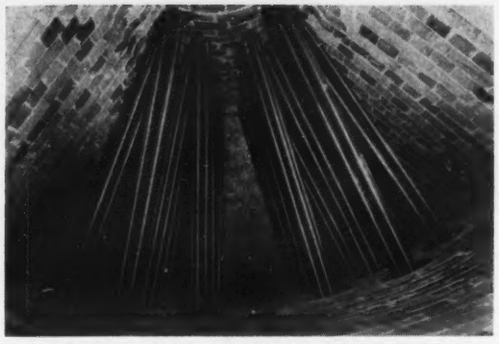
Sulfuric acid concentrator equipped with multiple tantalum bayonet heaters

tantalum is maintained up to 85% acidity. Tantalum heaters can be used for concentrating sulfuric acid at steam pressures up to 150 psi. When temperatures are expected to exceed 170°C, tests should be made before tantalum is used.

Multiple heater consists of a cluster of tantalum bayonets welded to single tantalum flange or tube sheet which covers the entire opening in the vessel through which the heater is installed. Unit it supplied with steam through base metal inner pipes leading from a steam chest outside the large flange. Bayonet heater is designed to be totally submerged so that all of the tantalum tubing may be used as effective heating surface.

Results: Operating results have been considerably improved by the use of tantalum bayonet heaters. In some cases, use of the tantalum heaters has increased capacity of system 25 to 35%, up to the size limit of vessels and vapor piping.

Because of the small overall size and high heat



Interior view of one concentrator, showing tantalum bayonet heaters

transfer rate of tantalum heaters, much less space is required for their installation. Actually, heat transfer of tantalum is four to five times as good as material used in past. In installing tantalum bayonet heaters on existing equipment, it was found that a smaller number of heaters is necessary to provide the same heating efficiency.

Experience at National Lead has reconfirmed the known corrosion resistance of tantalum to sulfuric acid. Furthermore, if the acid is relatively non-fouling, tantalum has a distinct advantage.

(Tantalum bayonet heaters are manufactured by Fansteel Metallurgical Corp., Dept. CP, North Chicago, Ill. Check CP 4004, pages 2 and 3.)

Covered with furane coating, concrete storage tanks handle chemicals . . .

chemical-resistant material may also be used for major repairs on eroded concrete

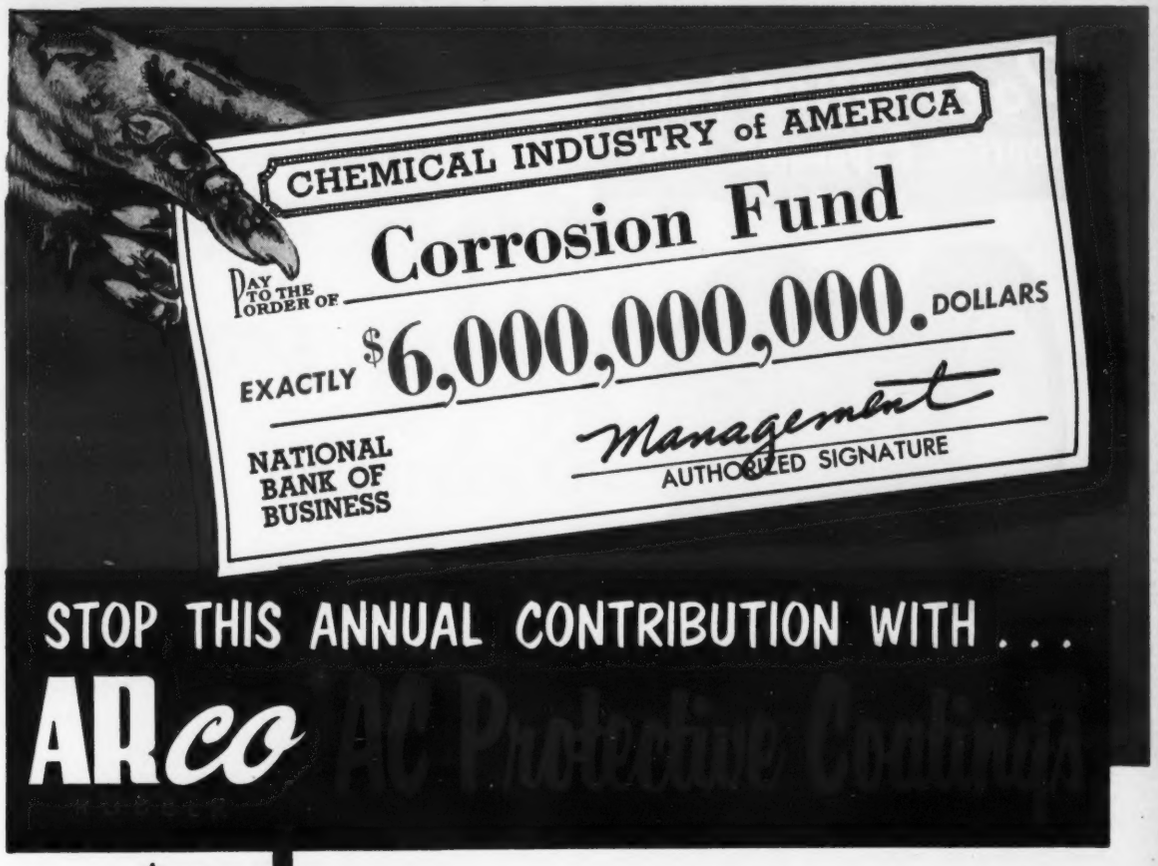
Uses: Application to surfaces of concrete storage tanks, rendering them suitable for handling chemicals that would otherwise attack concrete. Also for effecting major repairs on concrete surfaces which have been eroded or spalled.

Features: Material has excellent resistance to most acids, alkalis, solvents, and petroleum.

Description: Furane coating, designated Jet-Kote Type X-3M, may be activated by its catalyst to form a sprayable mixture. At least three of these sprayed coats are recommended, with overnight drying for each coat. When large concrete tanks are involved, reinforcement of material with wide open-mesh cloth is suggested.

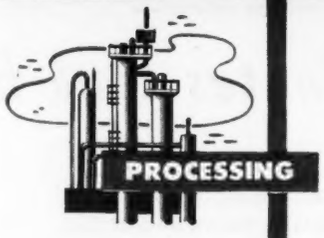
In combination with activated silica, coating may be used to form a quick-setting trowelable paste, suitable for fill-in of large pores and cracks.

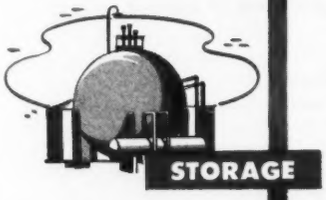
(Coating for concrete is a product of Furane Plastics, Inc., Dept. CP, 4516 Brazil St., Los Angeles 39, Calif. . . . or check CP 4005, pages 2 and 3.)



STOP THIS ANNUAL CONTRIBUTION WITH . . .

ARco AC Protective Coatings



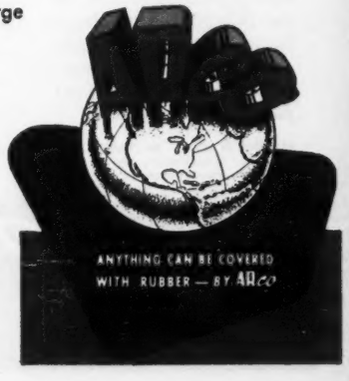


• You can reduce corrosion's yearly toll of repair man-hours and shut down plants; loss of costly equipment; contamination of materials and loss of production. Call ARco Engineers to assist you in combating these liabilities.

Whether your requirements are design, fabrication, insulation, and erection of complete ventilation, storage and processing installations . . . or cooperation with your equipment manufacturer in making your systems corrosion proof . . . ARco Engineers and ARco *Anti-Corrosion rubber coatings assure you the competence in service, quality in materials and skill in workmanship that will free you from making the annual contribution to the corrosion fund.

ARco FIELD SERVICE UNITS, complete with equipment, experienced supervisors and skilled craftsmen will make expert rubber applications *on the job* . . . regardless of location . . . on equipment too large to move or permanently installed.

Write for complete information



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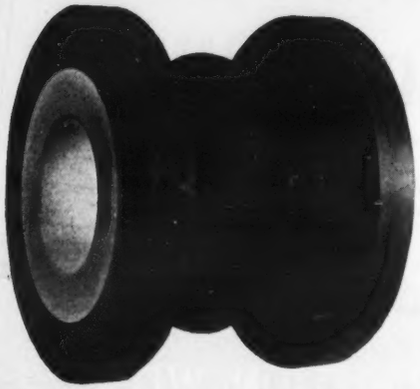
Serving the South and Southwest

ARco Rubber Processors
4033 Homestead Rd. • Houston, Texas

When inquiring check CP 4006 on handy form, pgs. 2-3

Doré TEFLON Lined Neoprene Expansion Joint

Style E-8-N



—STRONGER, TOUGHER,

withstands higher pressure and temperature

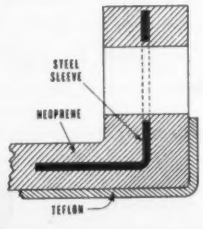
WORKING PRESSURE: THRU 10" 150 P.S.I. TEMPERATURE: 250° F.

This new expansion joint, developed by Doré, is built to meet the requirements of rugged service. The TEFLON tube, completely lining the neoprene and duck section, gives the joint the inertness of TEFLON plus the strength, temperature and pressure properties of neoprene and duck.

A steel sleeve imbedded in the center of the joint prevents distortion of the flange — transmits bolt pressure direct to flange face. There is no cocking of the flange to break the seal between TEFLON and Neoprene and TEFLON and companion flange. The duck or steel sleeve are never touched by line commodities.

Sizes 2" through 8" are 6" flange to flange. 10" and 12" are 6½" flange to flange.

Cross section detail of steel sleeve imbedded in the Neoprene and duck. In addition to strength and rigidity, the steel sleeve assures perfect flange to flange seal.

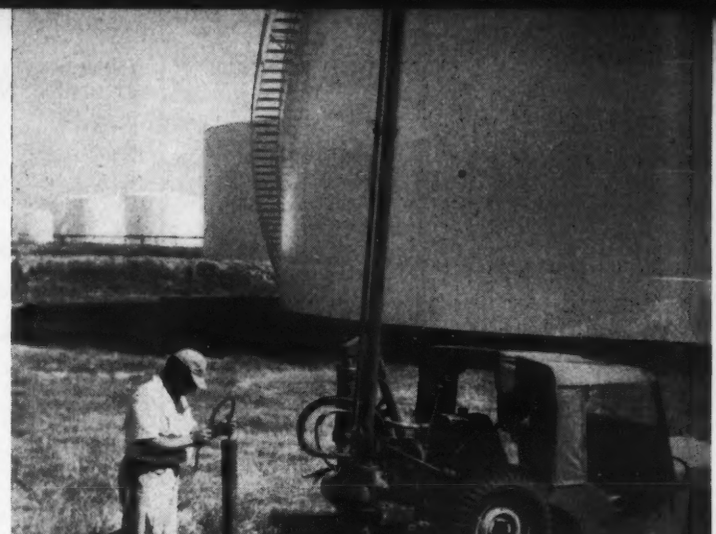


TEFLON is E. I. du Pont's registered trademark for Tetrafluoroethylene resin.

John L. Doré, Co.

SALES AGENTS IN U.S.A. FOR JOHN L. DORE' INC.
MOLDERS OF TEFLON SHAPES
P. O. BOX 7772 • HOUSTON 7, TEXAS

When inquiring check CP 4007 on handy form, pgs. 2-3



Graphite anode is inserted in augered hole during installation of cathodic protection system at General American's Galena Park Terminal

Saving product and promoting safety, cathodic protection system—

eliminates tank bottom failures

Rectifier system guards against loss, such as resulted with the failure of four tank bottoms before graphite anode installation was placed in service

DR. ROBERT SPRAUL,
Mgr. Research & Testing Laboratory
W. A. BUCKNER,
Plant Superintendent, Galena Park
General American Transportation Corporation
with **GORDON WEYERMULLER,** Associate Editor

Problem: During the past few years four tank bottoms failed at the Galena Park, Texas Terminal of General American Transportation Corporation. Cost for replacing tank bottoms was about $10,000 to $20,000 each. Failure of tank bottoms involved possible hazard and loss of product. It was necessary to take a tank out of service for about one month to replace a bottom.

Tank terminal, located on the Houston ship channel, serves as a public warehouse for liquids which are moved in and out by pipeline, rail, and ship. Facilities include 87 steel welded tanks varying in capacity from 500 to 80,000 bbl. Products handled include benzene, toluene, xylene, aqua ammonia, petroleum oils, and gasoline.

Solution: A rectifier-graphite anode cathodic protection system was placed in service in January of 1954. Area of tank bottoms and associated piping to be protected was about 215,000 sq ft of metal surface. Current density of 1½ milliamp/sq ft of metal surface was selected as necessary to provide complete protection, i.e., steel-to-soil potentials of −0.85 volts minimum to copper/copper sulfate reference electrode. Selection of current density was based on soil resistivity measurements of 300 to 1000 ohm-cm, indicating highly corrosive conditions.

Five rectifier-graphite anode ground bed protective units are used. Ground beds consist of 3" diameter by 60" long graphite anodes installed in 12" diameter holes, as shown above. Each anode was installed in a carbonaceous backfill, extending one foot above and one foot below anode. Anodes were placed on 15 to 20' centers. Each anode was connected to an insulated aluminum header cable, which was then

connected in turn to positive terminal of rectifier. Negative terminals of rectifiers were connected to interconnecting pipelines between tanks by means of insulated copper cable.

Each of the five rectifiers was mounted on a concrete slab, such as shown below. A 440-volt, three-phase power line was extended from existing transformer bank to serve rectifier units.

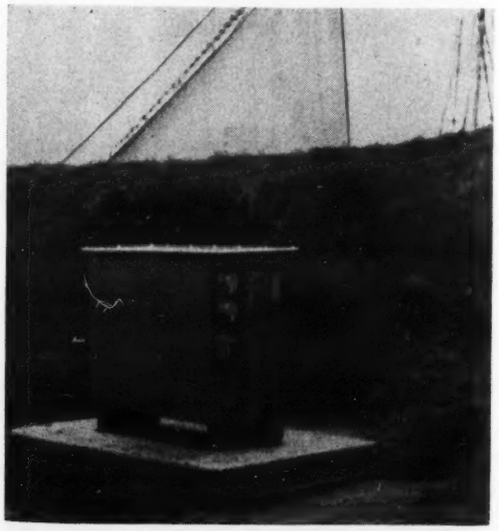
Frequent changes of contents within storage tanks cause changes in resistance and made it necessary to assure an electrically-continuous system for efficiency of system and safety. For this reason, and since only common connections between tanks were coupled lines, these couplings were bonded across with copper cable. Rail bonds were completed by Southern Pacific Railway Company in tank car siding area to assure safety while loading tank cars. Seven multiple pipe bonds were made at key locations in order that entire terminal would be better electrically interconnected, providing more complete distribution of cathodic protection current.

After initial installation, coupled lines which now contain plain rubber gaskets were provided with Armored® rubber gaskets. These gaskets have a brass coil imbedded in tip. They are designed for couplings carrying solvents or other products which may attack rubber. In this cathodic protection application, they eliminate additional bonding and help maintain electrical continuity.

Insulated flanges were installed ahead of loading docks. All pipes were bonded together and grounded on dock side of the flanges as a safety measure. Product, water, and natural gas lines entering terminal were insulated so that no cathodic protection current would be lost to them.

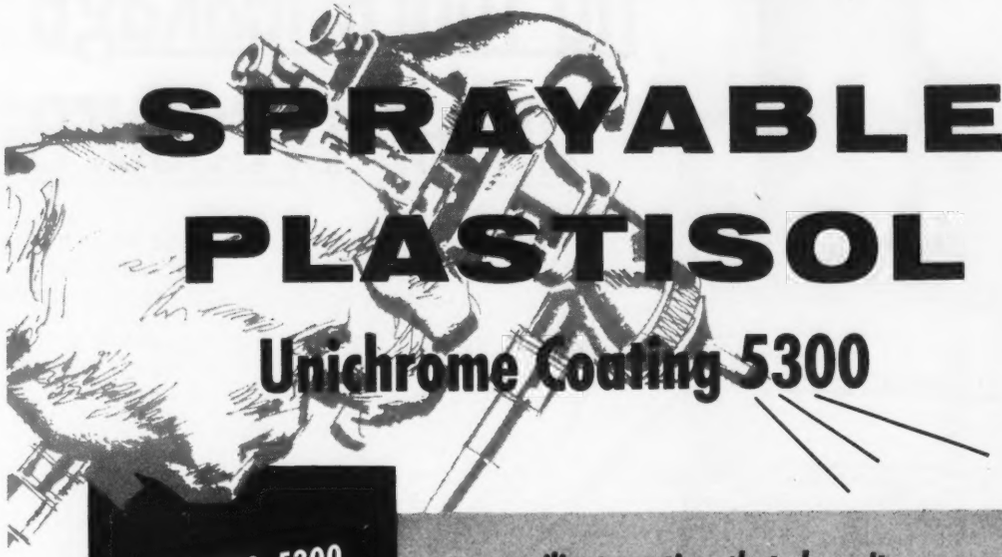
Results: Tank failures such as have occurred in

(*Continued on next page*)



One of five rectifiers protecting storage tanks

New corrosion-control "tool"...



SPRAYABLE PLASTISOL

Unichrome Coating 5300

COATING 5300 PROVIDES . . .

- *a resilient coating that doesn't crack, chip or tear*
- *.020" of pore-free protection per coat*
- *seamless, continuous heavy coatings*
- *chemical resistance of vinyls*

Any metal surface that can be sprayed and uniformly baked can now be strongly protected against severe corrosive conditions with the first practical, spraying plastisol—Unichrome Coating 5300.

This versatile coating offers many advantages over paint and ordinary protective coatings. With Coating 5300, you can apply chemical-and abrasion-resistant films as thick as .020" with a *single* spray application. That's 5 to 20 times thicker than ordinary coatings. In fact, multiple sprayed coats of this new material build films as thick as many sheet lining materials—and at less cost.

Unichrome Coating 5300 offers seam-free and pore-free protection against acids, alkalies, water, salt solutions and many other corrosive agents. It levels surface irregularities, and together with its heavy build-up, eliminates weak spots where corrosion might ordinarily break through. A vinyl material with 100% solids, it bakes into a resilient coating that resists abrasion, chipping and cracking.

Here is a new and better way to protect interiors, exteriors of tanks, ducts and other large equipment from corrosion. If your plant lacks baking facilities, there are conveniently located jobbers in most sections of the country who can apply Coating 5300 for you.

MORE INFORMATION on Unichrome Plastisol Compounds presented in Bulletin VP-1. Send for it.

UNICHROME Trade Mark **COATINGS FOR METALS**

UNITED CHROMIUM, INCORPORATED

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Chicago 4, Ill. • Los Angeles 13, Calif.
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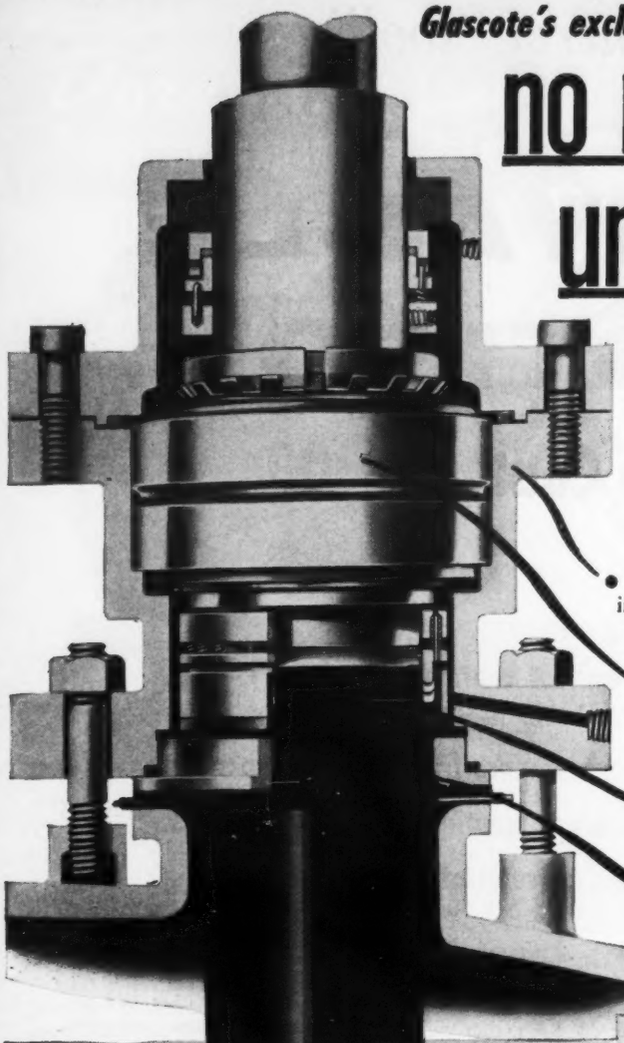
When inquiring check CP 4008 on handy form, pgs. 2-3

Glascote's exclusive rotary mechanical seal means

no more leakage under pressure

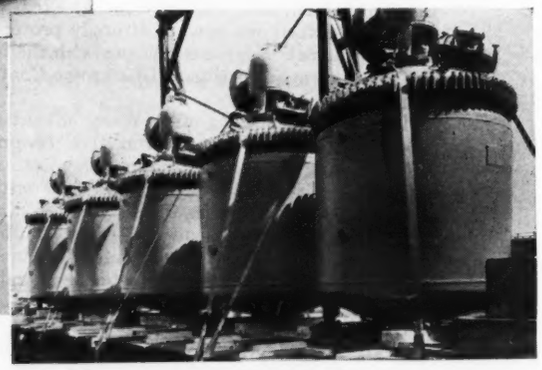


OPERATING GLASS-LINED VESSELS UNDER TOXIC OR EXPLOSIVE CONDITIONS? GLASCOTE'S POSITIVE SEALING IS THE ANSWER!

No other seal is so effective on glass-lined vessels with top-entering glass-coated agitators. Exclusive features promote successful use of higher pressures . . . prevent contamination of vessel contents.

- A balanced pressure system. Pressure in liquid-tight housing is kept higher than internal vessel pressure through use of coil springs and pressure-circulation of oil or other cooling lubricant.
- Timken bearing assures constant alignment of sealing surfaces . . . prevents agitator wobble. Sealing materials are a carbon gland insert and seal-rings of insoluble Teflon.
- Blue color shows how glass lining extends up into the unit . . . past tight-sealing carbon insert. No contaminating material can enter the vessel.
- Ground glass portion of agitator shaft promotes snug fit.

Glascote
now serves you
as a subsidiary of
A.O.Smith



IT was a significant merger indeed when Glascote joined A. O. Smith—world's largest manufacturer of glass-lined steel products. Now A. O. Smith's facility and research in ceramics and metallurgy broaden the working range of Glascote's own technicians.

Processors can count on a continuous flow of exclusive developments like the one featured above. They will continue to enjoy the superior corrosion-resistance and advanced design of Glascote reactors, receivers, condensers, evaporators, storage tanks and transport tanks.

You will find Glascote products in use at duPont, Carbide & Carbon, Naugatuck, Dow and other companies. How about your plant?

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When inquiring check CP 4009 on handy form, pgs. 2-3

(*Continued from preceding page*)

the past will be eliminated by the cathodic protection system. Prevention of possible loss of product and maintenance of safety have been achieved.

Survey made soon after installation was completed indicated a minimum potential of −0.92 volts, average being above −1.00 volts. Since minimum potential requirement is −0.85 volts, adequate protection was indicated. Rectifier currents vary from 76 to 100 amperes at 10 to 16 volts on various rectifiers. Based on past experience, some downward adjustment of currents probably may be made after six months or more of operation, if indicated by semi-annual resurvey.

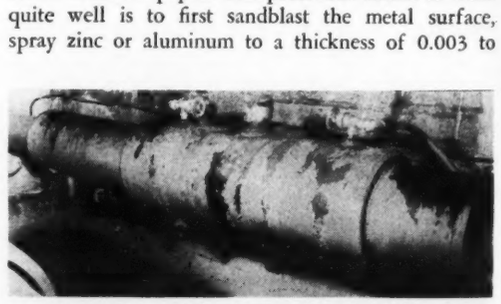
(Cathodic protection system was installed by Cathodic Protection Service, Dept. CP, 4601 Stanford St., Houston 6, Tex. . . . or for more information check CP 4010 on handy form, pages 2 & 3.)

(Armored rubber gaskets are product of Dresser Mfg. Div., Dresser Industries, Dept. CP, 103 Fisher Ave., Bradford, Pa. . . . check 4010A, pages 2 & 3.)

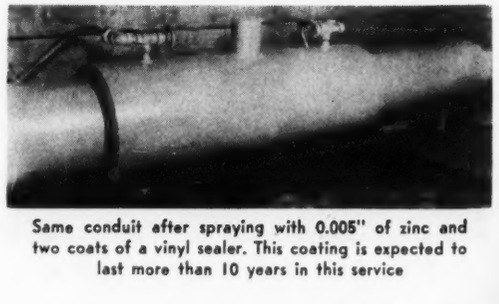
Economical prevention of corrosion offered by metallizing in cases where conditions are severe . . .

> good procedure is to spray zinc or aluminum, then seal with organic coating

As the environment becomes increasingly severe, metallizing becomes more and more economical as a method of controlling corrosion, as pointed out in a recent technical paper. One procedure found to work quite well is to first sandblast the metal surface, spray zinc or aluminum to a thickness of 0.003 to



Underground conduit, showing condition after less than a year of service



Same conduit after spraying with 0.005" of zinc and two coats of a vinyl sealer. This coating is expected to last more than 10 years in this service

0.010", then seal with a vinyl organic coating.

For relatively mild environments, thin zinc and aluminum coatings 0.003 to 0.004" thick are usually used with vinyl or chlorinated rubber sealers and without inhibiting primers. For industrial atmospheres, aluminum coatings of 0.005 to 0.008" are usually preferable and are used with vinyl sealers. Primers containing inhibitors are recommended where the exposure is likely to be continuously damp.

For salt spray exposures, either aluminum or zinc is used in thicknesses from 0.003 to 0.010", depending on service. Vinyl and chlorinated rubber sealing coats are generally applied over inhibiting primers whenever surface is continuously damp. Many specialized coatings have been developed for fresh and salt water immersion.

Metallizing systems developed for relatively high temperatures have proved quite successful. Diesel exhaust stacks at temperatures up to 900°F are protected by 0.006" of sprayed aluminum sealed with a silicone aluminum organic coating.

Specialized coatings for resistance to temperatures up to 2000°F have also been developed. In lower temperature range, up to about 1500°F, pure sprayed aluminum is used, sealed with a bitumen-type coating. Surface is then heat treated to cause absorption of the aluminum into the steel base. For the higher temperature range between 1500 and 2000°F, coatings of nickel-chromium alloys covered on the outside with aluminum are used. These coatings do not require heat treatment and where sufficient aluminum is used on the outside, they are resistant to sulfur gases.

(Condensed from paper, "Metallized System Coatings," by H. S. Ingham, Metallizing Engineering Co., Inc. Paper was presented at the 1954 annual meeting of the National Association of Corrosion Engineers in Kansas City, Mo.)

(For further information contact Metallizing Engineering Co., Inc., Dept. CP, 1101 Prospect Ave., Westbury L. I., N. Y. . . . or check CP 4011 on handy form, pages 2 and 3.)

Safer fluid transmission with plastic tubing

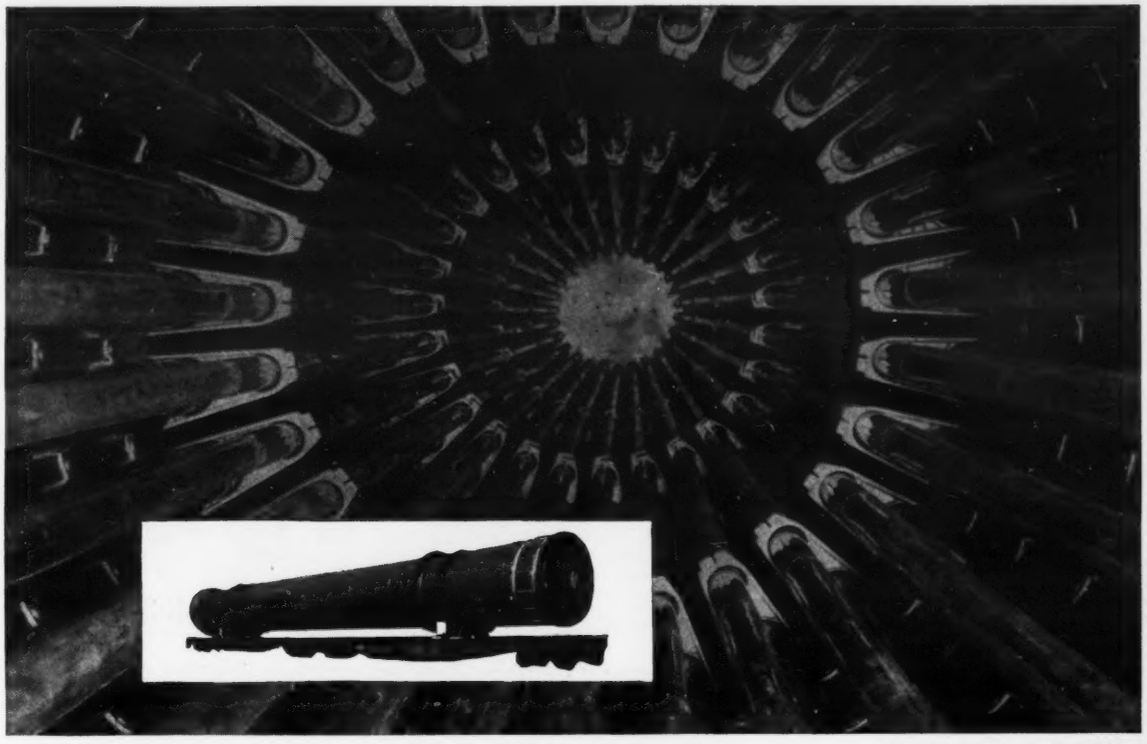
Booklet of 28 pages is devoted entirely to a discussion of the properties and uses of standard Tygon formulations in extruded (tube) form. Applications described include those for chemical plants, laboratories, and pharmaceutical manufacture. Physical properties of tubing are covered in considerable detail and tabulated.

Bulletin on Tygon tubing is available from Plastics & Synthetics Division, U. S. Stoneware Co., Dept. CP, 5300 Tallmadge Ave., Akron 9, Ohio. When inquiring specify CP 4012, pages 2 and 3.

Louisville Method

PROVED PATTERN

for safe drying of easily contaminated materials



Aluminum-fitted Steam Tube Dryer with aluminum steam tubes

When it comes to handling materials that are corrosive or are easily contaminated—it pays to see your Louisville engineer. Every Louisville Dryer is *special*—built, not assembled—to insure safer, more economical drying of your products. Results can be *proved in advance* through practical tests in our pilot plant. Your dryer is built by mechanics thoroughly experienced in fabricating and welding *aluminum, nickel, stainless steel* and *monel metal* as well as carbon steel and other materials. To take the guesswork out of your drying problems, let a Louisville engineer-specialist work out a solution with you. Of course, there's no obligation.

PROCESS EQUIPMENT DIVISION GENERAL AMERICAN TRADE MARK

LOUISVILLE DRYING MACHINERY UNIT
over 50 years of creative drying engineering

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Other General American Equipment: Turbo-Mixers • Dewaterers Towers • Tanks • Pressure Vessels

For dependability see General American—creative engineering, design, construction, installation

When inquiring check CP 4013 on handy form, pgs. 2-3

Aluminum cladding stops corrosion of water pipes

Uses: Designed for handling highly corrosive irrigation or waste water.

Features: Continuous welded tubing is lightweight and has higher resistance to crushing, bursting, denting, and sagging than pipe produced by other methods.

Description: Cladding is thin lining which is integrally bonded in rolling process to stronger aluminum alloy sheet from which tubing is made. Made possible by continuous electrically welded method of production, pipe is available in diameters ranging from 2 through 5". Pipe is available in 40' lengths. Unclad tubing is made up to 6" diameter.

(Aluminum and aluminum-clad pipe are products of Kaiser Aluminum & Chemical Corp., Dept. CP, 1924 Broadway, Oakland 12, Calif. Check CP 4014, pages 2-3.)

Primer, coating resist corrosive agents . . .

offer protection against fumes, weathering, abrasion

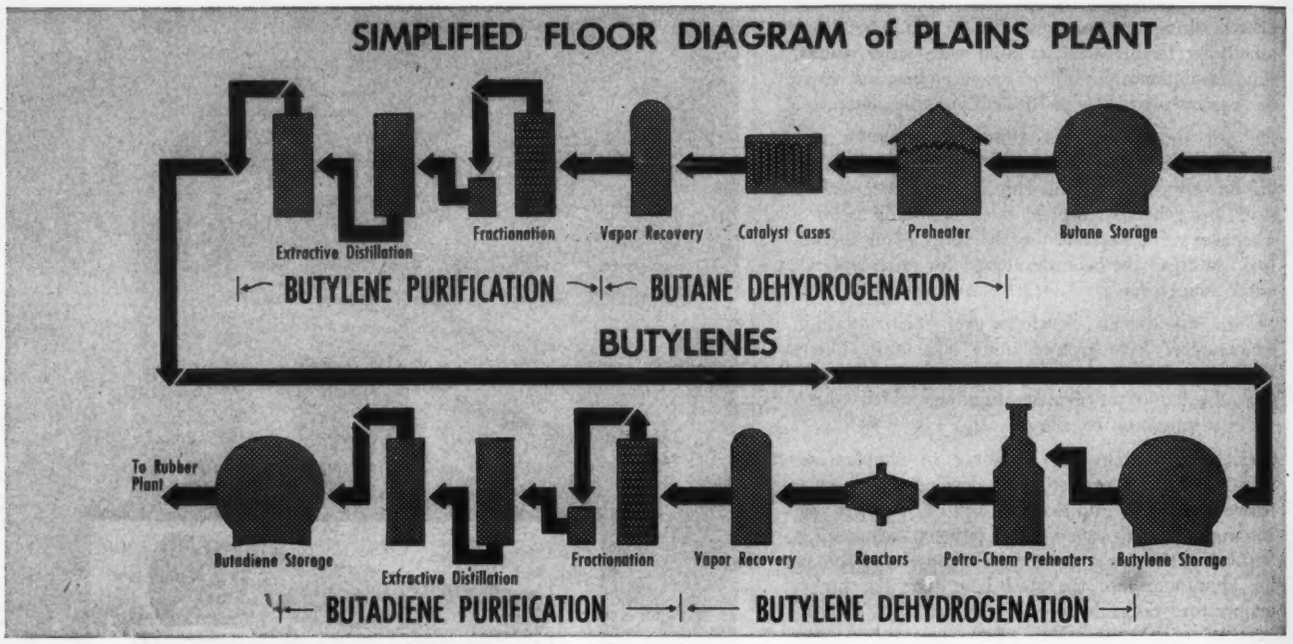
Corrosive-resistant primer and coatings have just made their market debut after three years of field testing. Known as Lanorust Primer PR-18 and Lankote 1000 Series Coatings, products are designed for industrial maintenance.

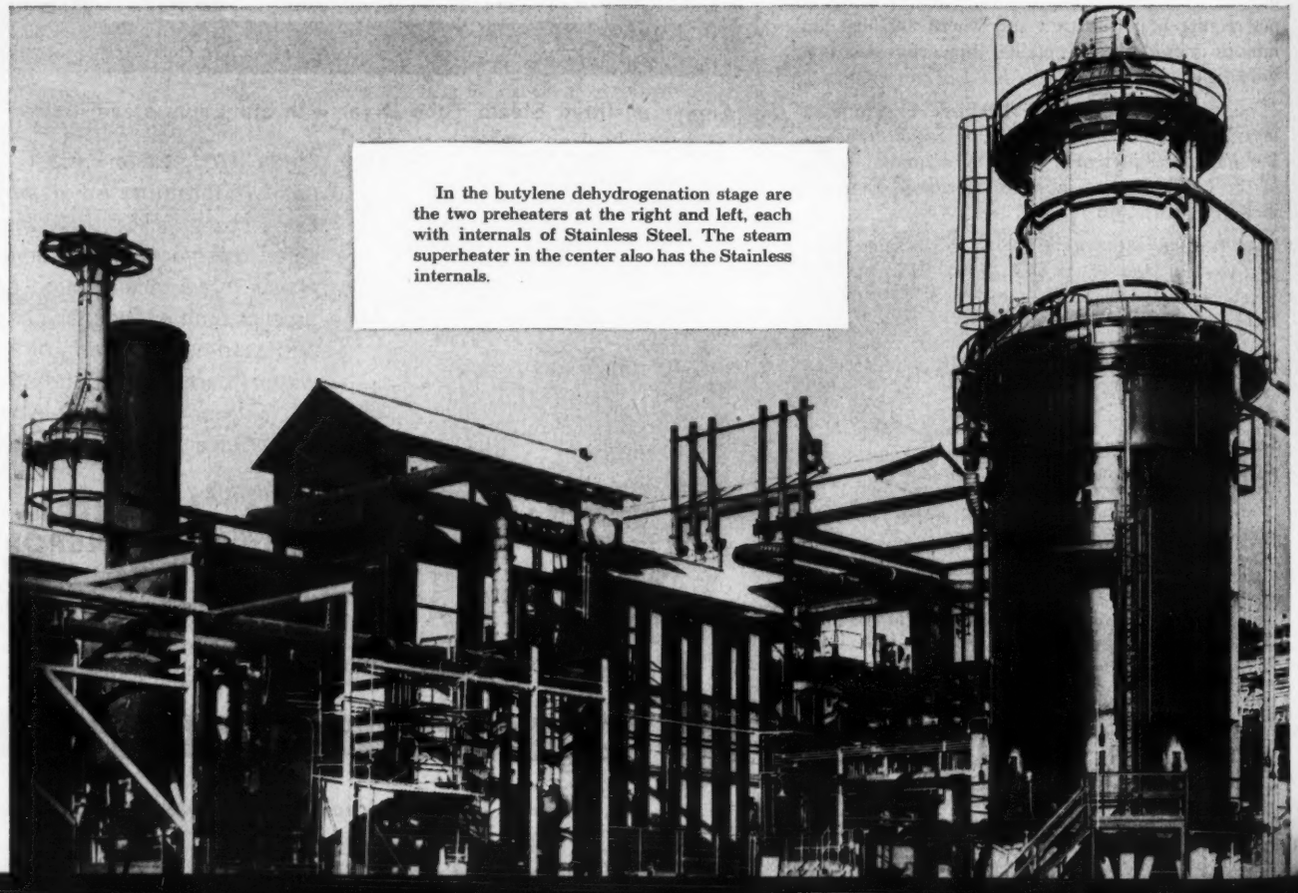
General purpose primer has good adhesion to rusty and galvanized metal surfaces. It can also be used on non-ferrous metals, cast iron, wood, concrete, and other construction materials. Primer may be used as undercoat for vinyl, chlorinated rubber, epoxy, oleoresinous, alkyd, and phenolic coatings.

Primer is formulated on base of alkyd and vinyl resins and is pigmented with two rust-inhibiting pigments — zinc chromate and iron oxide.

Easily applied by spray or brush,

How Stainless Steel helps maintain





In the butylene dehydrogenation stage are the two preheaters at the right and left, each with internals of Stainless Steel. The steam superheater in the center also has the Stainless internals.

uninterrupted butadiene production

PETROCHEMICAL processing is like a chain . . . break a single "link" and the entire operation may come to a halt. That's why the most careful attention must be paid to the materials from which key equipment is made. That's why Stainless Steel plays such an important role.

The flow diagram shows the stages in producing butadiene from butane at Plains Plant, Borger, Texas, operated for the Government by Phillips Chemical Company, wholly owned subsidiary of Phillips Petroleum Company. And here are the applications of Stainless Steel in the various stages:

BUTANE DEHYDROGENATION — tubes in the preheater, lines to catalyst harps and their headers, and the catalyst harps themselves. (In this stage, there are 275 Stainless catalyst harps, each weighing 1800 pounds.) Other uses include valves, fans, and, in the regeneration gas blower, turbine blades, nozzle rings and small valves.

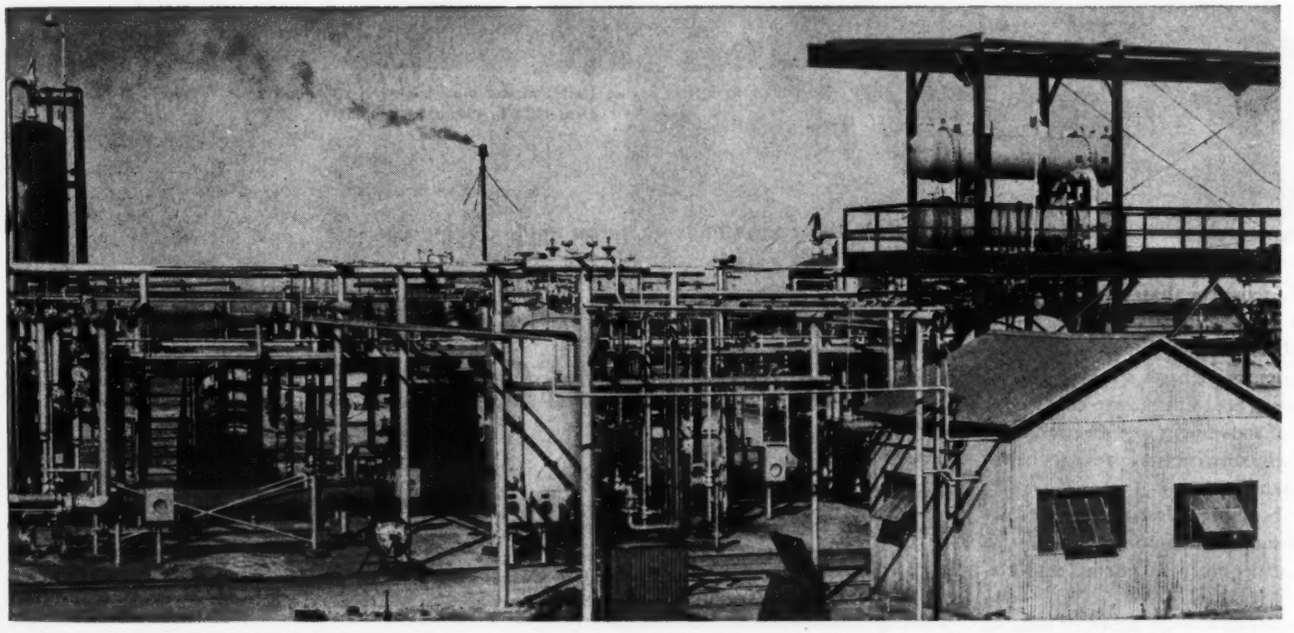
BUTYLENE PURIFICATION—furfural absorbers, bubble caps, risers and lining at the base of fractionating towers.

BUTYLENE DEHYDROGENATION—internals of the feed preheaters and steam superheater, valves to catalyst harps, catalyst harps, valves and fans.

BUTADIENE PURIFICATION—lining of evaporator, agitator piping, rerun stripper and numerous valves.

Some of the Stainless Steel in this plant was made by United States Steel—some came from other sources. But whatever its source, Stainless Steel's strength at elevated temperatures and its superior resistance to corrosion made it a wise selection. In every case, the operating conditions determine the exact composition of the Stainless used.

There is a grade of perfected, service-tested USS Stainless Steel suitable for every application. Our representatives will be glad to work with you in determining the grade best suited for each individual job.



Furfural rerun unit. The stripper at the extreme left is lined with Stainless and has five trays of the same material. The evaporator located to the left of the flare is Stainless Steel, too.

UNITED STATES STEEL CORPORATION, PITTSBURGH • AMERICAN STEEL & WIRE DIVISION, CLEVELAND • COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
NATIONAL TUBE DIVISION, PITTSBURGH • TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA. • UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS STAINLESS STEEL

SHEETS · STRIP · PLATES · BARS · BILLETS USS PIPE · TUBES · WIRE · SPECIAL SECTIONS

4-295

UNITED STATES STEEL

primer will dry to touch in 10 minutes. When dry, it is tough, flexible, and has excellent resistance to weathering, salt spray, chemical fumes, and mechanical abrasion.

Lankote 1000 Series Coatings are epoxy resin-based materials which are cured by addition of catalyst. They cure at ordinary room temperatures to film which is resistant to alkali, organic solvents, and mineral acids. In addition to good corrosion-resistant properties, coatings have good physical and coating characteristics such as hardness, toughness, flow-out, flexibility retention, heat stability, color retention, and pot-life.

Coatings give good resistance to many corrosive agents at elevated temps and will withstand dry heat as high as 425°F. They are available in various colors, formulated with acid- and alkali-resistant pigments.

(Lanorust PR-18 and Lankote 1000 Series Coatings are products of Lankote Div., J. Landau Co., Dept. CP, 221 Wooster St., New York 12, N. Y. . . . or for more information check CP 4015 on handy form, pages 2 and 3.)

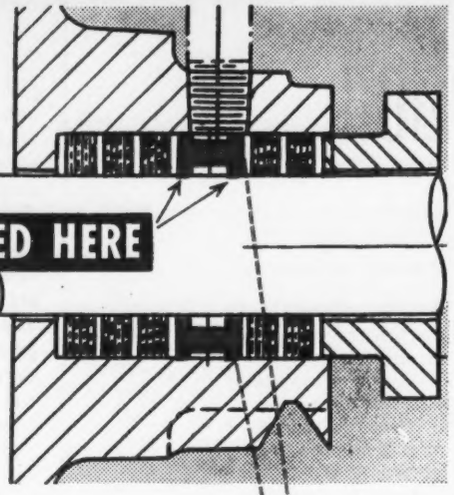
Provides reference data on high-temp alloy

Complete engineering reference data on HR-6 (25-12) cast alloy are provided in four-page bulletin. Literature should be of particular interest to engineers and designers of equipment parts subject to temperatures up to 2000°F. Chemical, physical, and mechanical properties are tabulated for quick reference.

Bul 4 is available from Standard Alloy Co., Inc., Dept. CP, 1679 Collamer Road, Cleveland 10, Ohio. When inquiring specify CP 4016, pages 2 and 3.

For more information on product at left, specify CP 4017 . . . see information request blank between pages 2 and 3.

THE LIFE OF YOUR PUMP SHAFT IS DETERMINED HERE



CHEMPRO TEFLON SEAL CAGES

for lubricating or cooling stuffing box packing

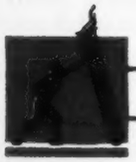
Flexible Chempro Seal Cages do not score the shaft as do two-piece metal lantern rings or other types of metal seals. They save the expense of replacing badly scored shafts in pumps and other processing equipment operating continuously at high speeds.

Machined in a single piece, Chempro Seal Cages snap easily over the shaft and *fit snugly.* No chance of movement or vibration even at very high shaft speeds. Their tough construction prevents bending or collapsing under extreme gland pressure.

For corrosive service, they are unbeatable – lasting many times longer than metal rings. They withstand continuous contact with acids, organic solvents, thionyl chloride, etc. – at normal and elevated temperatures.

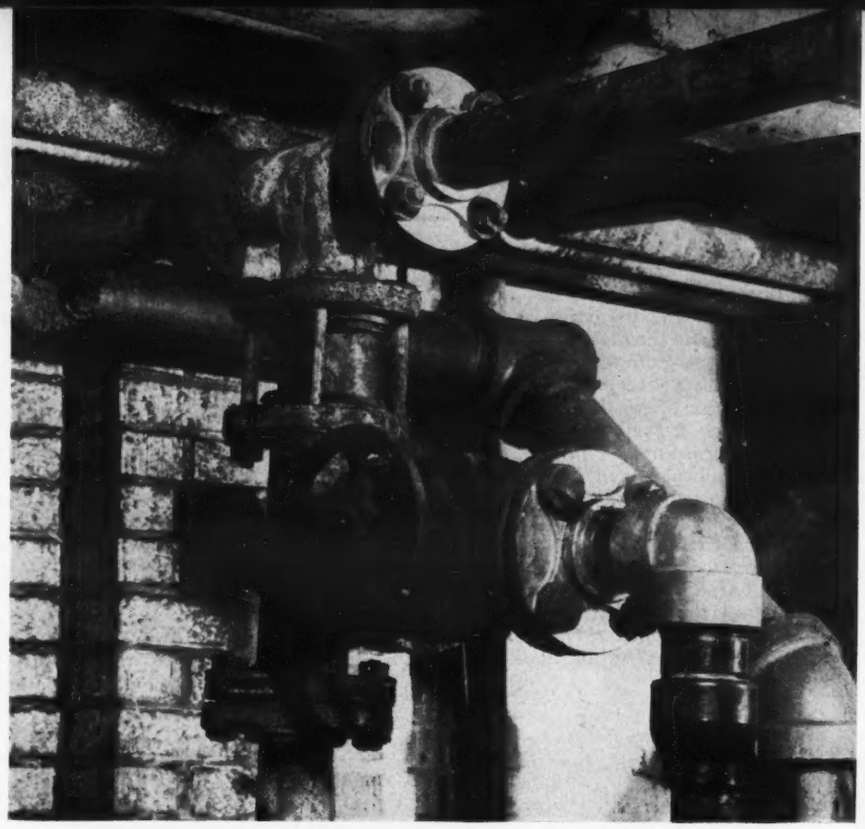
Chempro Teflon Seal Cages are made in a wide range of sizes to fit most shaft diameters and stuffing box bores.

Write for complete Chempro Packing and Gasket Catalog.



CHEMICAL & POWER PRODUCTS, INC.—
The Original Fabricators of Teflon Packings and Gaskets
9 Broadway, New York 4, N. Y.

When inquiring check CP 4018 on handy form, pgs. 2-3



Connected to former piping (left), plastic pipe (right) is still good after 1½ years of handling HCl in strengths up to 20%

In process lines at Huron Milling Company

plastic pipe resists HCl at -10 to 150°F

Pipe is easy to cut, thread, and install

ROBERT O. WRIGHT, Technical Supervisor, The Huron Milling Co., Harbor Beach, Mich.
With **FRANK E. McELROY,** Assistant Editor

Problem: Although proving fairly successful in transporting hydrochloric acid and amino acid hydrochloride solutions in the production of monosodium glutamate from wheat gluten, previous pipe was difficult to install or replace. A large number of different lengths had to be carried in stock as the pipe could not be satisfactorily cut and fitted in the field.

Consequently, a pipe that would overcome this objection and could withstand the highly corrosive application was sought.

The HCl solutions conveyed varied in strength from 1% to 36%, and in addition the atmospheric conditions were extremely severe.

Solution: Within the last five years, Huron began to replace its previous pipe with Uscolite pipe and fittings in many parts of its chemical operations. Besides corrosion-resistance, pipe (made of styrene-acrylonitrile copolymer) withstands shocks of heat and cold in climate and also in the liquids from −10 to 150°F. Above 120°F, however, pipe supports must be placed closer together in order to maintain rigidity.

Results: Company reports it has never had a performance failure or replaced a single foot of plastic pipe due to structural breakage. Even after subjecting it to extremes of heat and cold, high humidities, and corrosive atmospheres, pipe has stood up with success and product purity has been maintained. Huron states that one of the major assets of the pipe is that it's easily cut, threaded, installed in the field with regular equipment.

(Uscolite pipe and fittings are products of Chicago Die Mold, Div. of U.S. Rubber Co., Dept. CP, 4001 W. Wrightwood, Chicago 39, Ill. . . . or check CP 4019 on handy form, pages 2 and 3.)

Develop pump parts of plastic to meet rigid mechanical requirements . . .

> Teflon impellers turn up 1700 rpm at 100 psi, 212°F and can run dry

Plastics are sometimes thought of as *substitutes* for metals in pumps for corrosives. Pump design, however, is best handled by specifying plastic for those applications where inherent properties of the plastic make it superior to metal.

Recently completed development project has achieved plastic pump parts for operation at 1750 to 1800 rpm in dry and non-lubricating fluids as well as corrosive ones. Materials developed in this project were non-oriented, glass-reinforced Teflon, sintered carbon, and elastomers such as Hypalon and neoprene.

Bearings, too, provide self-contained inherent lubrication for dry starch and for operation with dry or non-lubricating fluids. Use of plastics also eliminated mechanical seizure. With corrosion no longer a problem, pumps suffer only mechanical wear.

Specifications of pump components allow maximum speeds of 1800 rpm at temperatures to 212°F for nearly all chemicals with Teflon bearings. Sintered carbon and graphite bearings allow speeds of 3450 rpm with temperatures to 300°F, but will not handle oxidizing chemicals.

Impellers made of Teflon are suitable for speeds to 1700 rpm, pressures to 100 psi, temperatures to 212°F or higher if impellers are machined under-size. When elastomers such as neoprene or Hypalon are used for impellers, speeds of 3450 rpm can be obtained with pressures to 150 psi.

Displacement pumps designed to use these components have successfully handled concentrated nitric acid, concentrated hydrogen peroxide, and other hazardous and sensitive materials.

(Digested from engineering report by Eric Anderson, Chemical Engineer of the Eco Engineering Co., Dept. CP, 12 New York Ave., Newark 1, N. J. . . . or for more information check CP 4020, pages 2 and 3.)

CRUCIBLE STAINLESS STEEL
keeps its shine
after long, hard wear...

The fact is stainless steel improves with wear, for the more it is used the harder and smoother the surface becomes. And there is never any surface plating to wear on a stainless product, for stainless steel is *stainless* all the way through.

Yes, Rezistal® stainless is a *natural* for products that must take long hard service, or that must resist corrosion or wear, or stand up under daily cleaning with strong detergents. Take, for example, the stainless mixing bowls shown. They'll give many years of trouble-free service. And their smooth, sanitary surface makes them especially suited to the processing of baked goods, candy, cosmetics or chemicals.

Be sure you take advantage of all the money- and time-saving qualities of stainless steel. And be sure you specify Crucible stainless . . . made by the country's leading producer of special purpose steels. You'll get fast delivery of the grade and size you need when you call Crucible.

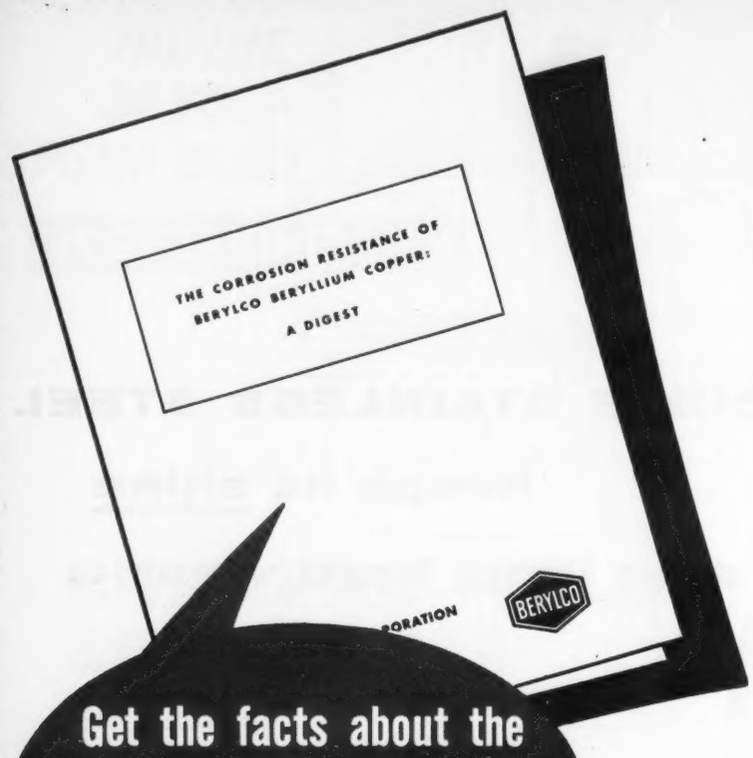
CRUCIBLE first name in special purpose steels

54 years of Fine steelmaking STAINLESS STEELS

CRUCIBLE STEEL COMPANY OF AMERICA, GENERAL SALES OFFICES, OLIVER BUILDING, PITTSBURGH, PA.

REX HIGH SPEED • TOOL • REZISTAL STAINLESS • MAX-EL • ALLOY • SPECIAL PURPOSE STEELS

When inquiring check CP 4021 on handy form, pgs. 2-3



Get the facts about the Corrosion Resistance of Berylco Beryllium Copper

This 4-page folder is a useful guide to the performance of beryllium copper alloys when exposed to a wide number of specific media. Send for your free copy today.

In general, Berylco resembles other high-copper alloys in resistance to corrosion. It has good resistance to marine and industrial atmospheres, fresh and salt water, most alkaline solutions, and some acids. It is not subject to season cracking or corrosion fatigue. It can be plated without danger of hydrogen embrittlement.

Why is Berylco selected over other materials of comparable corrosion resistance? Berylco beryllium copper parts are stronger, wear better, have greater resistance to moderately elevated temperatures than other copper-base alloys; also they gain in strength, ductility and impact resistance at subzero temperatures. Berylco is an age-hardening alloy, can be easily worked while soft, then hardened by a simple low-temperature heat treatment for maximum strength, wear resistance and conductivity.

Berylco beryllium copper alloys are available in a number of wrought forms or as casting ingots for immediate delivery

BERYLCO **THE BERYLLIUM CORPORATION**
Dept. 4L, READING 22, PA.
New York • Springfield, Mass. • Rochester, N.Y. • Philadelphia • Cleveland
Dayton • Detroit • Chicago • Minneapolis • San Francisco • Los Angeles
Representatives in principal world-trade centers

When inquiring check CP 4022 on handy form, pgs. 2-3

Resistance of glass-lined pipe better with higher acid concentration

Laboratory work has shown that the corrosion resistance of manufacturer's glass-lined pipe improves as the acid concentration increases, as shown:

Resistance of Glass-lined Pipe

Material	Concentration	Resistance
Hydrochloric acid	0-10%	Good
	Over 10%	Excellent
Sulfuric acid	0-30%	Good
	Over 30%	Excellent
Nitric acid	0-20%	Good
	Over 20%	Excellent
Organic acids	All	Excellent
Alkalis	0-10%	Fair
	Over 10%	Poor
Hydrocarbons	.....	Excellent

(Further information on glass-lined pipe may be obtained from Barrows Porcelain Enamel Co., Dept. CP, Langdon Farm and Penn R. R., Cincinnati, Ohio . . . or check CP 4023, pages 2 and 3.)

Successful use of stainless steels depends on design, fabrication, installation of equipment . . .

duPont engineer explains how local corrosion can be prevented

In a recent technical paper, a du Pont engineer points out that full realization of the corrosion resistance of stainless steels is determined to a considerable degree by the design, fabrication, installation, and operation of the equipment. If the importance of these factors is not realized, in many cases results will be no better than if low-alloy steel had been used. Case histories covering performance records in du Pont plants illustrate rules given for preventing corrosion.

Although equipment may be designed with a sufficient safety factor to allow for general corrosion, local corrosion may break through the protective film on stainless steel and cause failure. Rules developed to prevent local corrosion follow:

1) Use butt welded joints whenever possible. When fillet welded joints are used, they should be continuous.

2) Do not join dissimilar metals or alloys if it can be avoided. If they are joined, make the larger area of the anodic material and electrically insulate whenever possible.

3) Design of equipment should allow complete drainage and easy washing.

4) Avoid sharp corners and recesses where stagnant areas of accumulations of solids could form.

5) Support equipment on legs to allow free circulation of air and eliminate damp areas.

FLOORED BY FLOORING PROBLEMS

YOUR SOLUTION IS IRVING GRATING

For heavily abused areas:
IRVING Continuity Armouring
concrete-filled steel grating floor will not crack or break up. Inexpensive to install, it eliminates costly repairs AND IS SAFE.

Non-Sparking and Corrosion-Resistant **ALUMINUM GRATING**
extra-light, self-draining, self-ventilating, economical, strong and durable.

Perfect for Chemical Plants where fire is a hazard.

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Ask about
IRVING "GRIDSTEEL"
CONTOUR RETAINER MESH
for Castable Ganister Linings used in refractionating units.

IRVING SUBWAY GRATING CO., INC.
ESTABLISHED 1902
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1850 10th St., Oakland 20, California

When inquiring check CP 4024 on handy form, pgs. 2-3

6) As much as practical, avoid turbulent flow and high velocities.

7) Avoid use of contact with porous materials such as asbestos or wood which absorb liquids.

8) Whenever possible anneal or stress-relieve.

9) Frequently clean all metal surfaces where sediments accumulate.

Importance of following foregoing rules is illustrated by a number of case histories, one of which follows: general and crevice cell corrosion was encountered in some vertical 316 stainless steel tubular condensers. Condensate consisted of 10% acetic acid. 10% formic acid, and the balance water at 70°C and atmospheric pressure.

As originally designed, tubes protruded slightly above the top tube sheet. In construction, tube rolling operation produced a slight crown in the tube sheet. A slight crevice was left between the tube and the tube sheet. Trapped process liquor corroded the channel section, the tube sheet, and the tubes. Leaks developed in 1 to 2½ years.

Cutting the tubes flush partly corrected situation. Liquor around periphery continued to cause crevice corrosion between tube sheet and tubes and to overflow into outermost tubes causing corrosion of their bores. Complete correction was achieved by altering rolling operation to keep a flat tube sheet and by rolling the tube tight to the top surface of the tube sheet.

New condensers have been in service more than five years. No failures have occurred and there are no indications of corrosion.

(Condensed from technical paper, "Effect of Design, Fabrication, and Installation on the Performance of Stainless Steel Equipment," by James A. Collins, Engineering Dept., E. I. du Pont de Nemours & Co., Wilmington, Del. Paper was presented at the 1954 annual meeting of the National Association of Corrosion Engineers in Kansas City, Mo.)

Proper "design" of boiler water cuts scale, corrosion losses

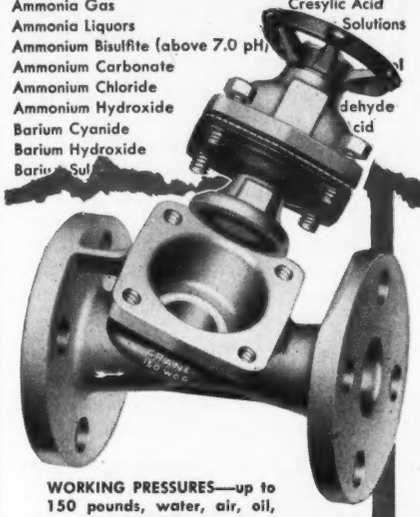
Need for proper "designing" of the mineral content of boiler water to prevent boiler losses due to corrosion and scale is described in six-page folder. Tracing methods of research and pretreatment of water, folder points out special knowledge and experience required to determine what an industrial boiler needs to make steam of required purity at minimum cost and maximum protection against boiler failure.

"Boiler Water" is available from Hall Laboratories, Inc., Dept. CP, Hagan Bldg., 323 Fourth Ave., Pittsburgh 30, Pa. When inquiring specify CP 4025 on handy form, pages 2 and 3.

Acetate Solvents, Crude
Acetate Solvents, Pure
Acetic Acid
Acetic Anhydride
Acetone
Acetylene, 15 psi
Air
Alcohols
Aluminum Ch
Aluminum P
Aluminum
Aluminu
Alums
Ammonia Gas
Ammonia Liquors
Ammonium Bisulfite (above 7.0 pH)
Ammonium Carbonate
Ammonium Chloride
Ammonium Hydroxide
Barium Cyanide
Barium Hydroxide
Bari
Carbon Dioxide, Dry
Carbon Dioxide, Wet
Carbonic Acid, Carbonated Beverages
Chromic Acid
Chromium Potassium Sulfate
Citric Acid
Coke Oven Gas
Cop
Creosote
Cresylic Acid
Solutions
dehyde
cid
Hydrogen Gas
Hydrogen Peroxide
Hydrogen Sulfide
Iron Chloride (Ferric)
Iron Chloride (Ferrous)
Iron Potassium Sulfate (Ferric Alum)
Iron Sulfate (Ferric)
Magnesium Chloride
Magnesium Hydroxide
Magnesium Sulfate
Magnesium Sulfite
Mercuric Chloride
Oxalic Acid
Petroleum Oils, Refined
Phenol (Carbolic Acid)
Phosphoric Acid
Sulfuric Acid
Sulfurous Acid
Tartaric Acid
Tin Chloride (Stannic)
Tin Chloride (Stannous)
Sulfate (Stannic)
Sulfate (Stannous)
Water, Acid Mine Waters
Water, Boiler Feed
Water, Distilled, Laboratory Grade
Water, Distilled, Return Condensate
Water, Fresh, Industrial Supplies
Water, Saline, Sea Water, etc.
Zinc Chloride

Name your poison

or any hard-to-handle fluid



WORKING PRESSURES—up to 150 pounds, water, air, oil, or gas, 250°F. maximum temperature, depending on valve size, materials, and service.

HOW CRANE DIAPHRAGM VALVES WORK

The Crane diaphragm serves one function only—sealing the bonnet. It is not subject to crushing and rapid wear. The seating member is a separate circular flat face disc, firmly attached to the stem and joined to the diaphragm with a special leak-proof connection. This independent seating feature permits positive shut-off with no loss of fluid, even in case of diaphragm failure.

CRANE HAS THE BETTER VALVE FOR IT!

Better because they're safer, easier to operate. *Better* because they reduce maintenance to a negligible degree. And that holds true for just about any service, any fluid within rated pressure and temperature.

For Crane now offers the revolutionary diaphragm valve in a new wide choice of body, disc insert and diaphragm materials—in unlined or lined patterns. You specify whatever combination best suits your particular need. The regular line-up includes brass, cast iron, aluminum, or 18-8 SMo body and disc . . . with diaphragm and disc insert of Neoprene, Buna N, Kel -F, or natural rubber. Regular linings are Neoprene or hard natural rubber. Also sliding stem valves for automatic operators of all types. In addition, Crane Diaphragm Valves are regularly available for high-vacuum service, or oxygen and acetylene usage. Other body and disc materials, as well as linings, available on special order. Sizes from ½ to 6-inch.

NEW LITERATURE . . . NEW FILM

Get complete, interesting facts about the expanded line of Crane Packless Diaphragm Valves in a new 24-page folder . . . and a new sound movie. You'll see how this revolutionary valve solves flow control problems where others fail. Check with your local Crane Representative, or use the coupon below.

CRANE CO., 836 S. Michigan Ave., Chicago 5, Illinois
Gentlemen:
I would like to arrange for a free showing of the Crane Diaphragm Valve Film ( ).
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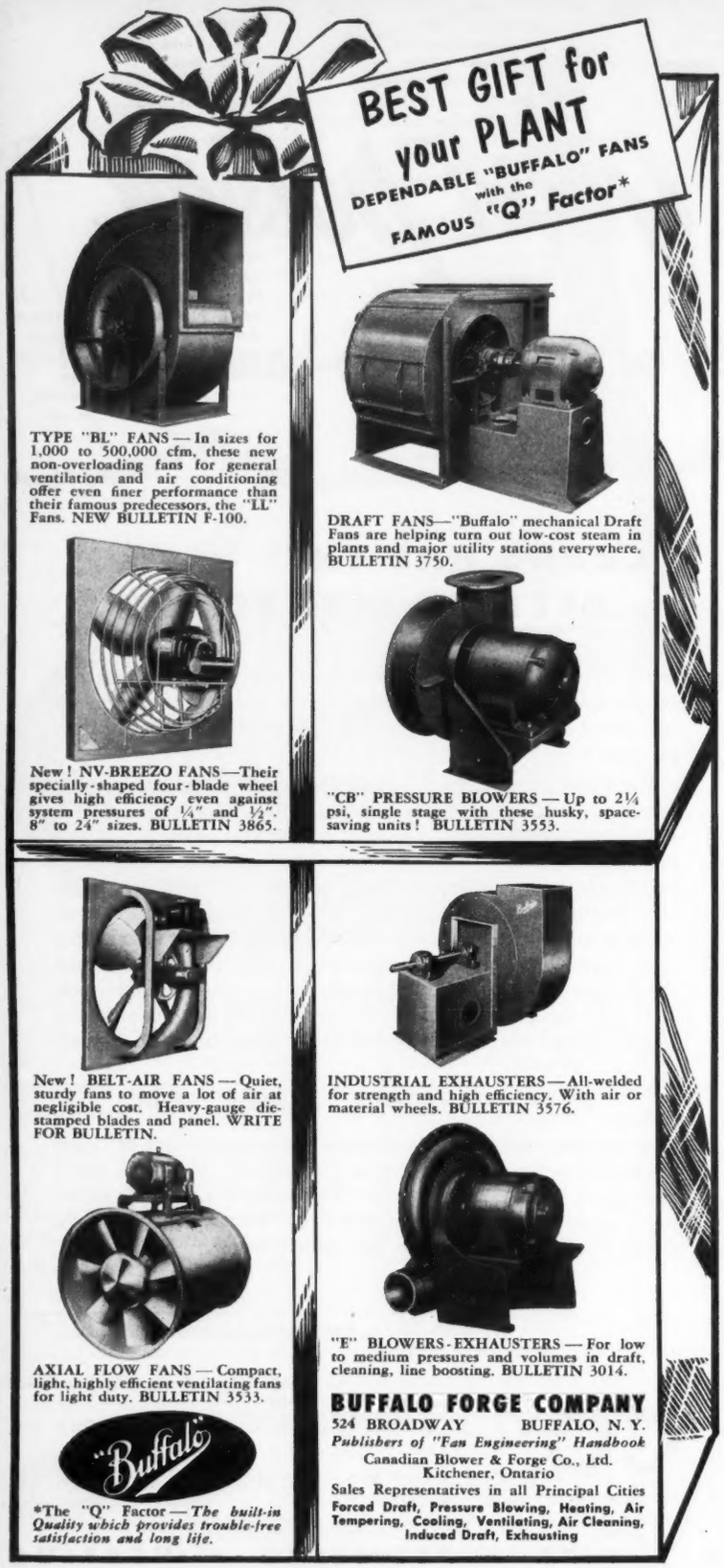
When inquiring check CP 4026 on handy form, pgs. 2-3


BEST GIFT for your PLANT
DEPENDABLE "BUFFALO" FANS with the FAMOUS "Q" Factor*
TYPE "BL" FANS — In sizes for 1,000 to 500,000 cfm, these new non-overloading fans for general ventilation and air conditioning offer even finer performance than their famous predecessors, the "LL" Fans. NEW BULLETIN F-100.
DRAFT FANS—"Buffalo" mechanical Draft Fans are helping turn out low-cost steam in plants and major utility stations everywhere. BULLETIN 3750.
New! NV-BREEZO FANS—Their specially-shaped four-blade wheel gives high efficiency even against system pressures of ¼" and ½". 8" to 24" sizes. BULLETIN 3865.
"CB" PRESSURE BLOWERS — Up to 2¼ psi, single stage with these husky, space-saving units! BULLETIN 3553.
New! BELT-AIR FANS — Quiet, sturdy fans to move a lot of air at negligible cost. Heavy-gauge die-stamped blades and panel. WRITE FOR BULLETIN.
INDUSTRIAL EXHAUSTERS—All-welded for strength and high efficiency. With air or material wheels. BULLETIN 3576.
AXIAL FLOW FANS — Compact, light, highly efficient ventilating fans for light duty. BULLETIN 3533.
"E" BLOWERS-EXHAUSTERS — For low to medium pressures and volumes in draft, cleaning, line boosting. BULLETIN 3014.
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*The "Q" Factor — The built-in Quality which provides trouble-free satisfaction and long life.
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When inquiring check CP 4027 on handy form, pgs. 2-3

CORROSION CONTROL

Sulfuric acid splash — neoprene coating resists it . . .

no failure after use 28 months

Problem: Conventional coatings were ineffective against sulfuric acid splash in concentrations up to 65%, average 120°F in a large Gulf Coast petrochemical plant.

Solution: Plant made a field test application of Gaco N-700 black neoprene maintenance coating on the exterior of a 4 x 10′ horizontal barometric steel sump drum. Surface preparation was limited to wire brushing the old paint and rust, then applying primer. Two brush coats of neoprene were applied.

Results: Test was scheduled to run until failure occurred, but after 28 months neoprene coating is still in good condition.

(Gaco N-700 neoprene coating is product of Gates Engineering Co., Dept. CP, P. O. Box 1711, Wilmington, Del. Check CP 4028 on handy form, pages 2 and 3.)

Steel of any thickness clad with nickel . . .

deposit can be .006 to .002″ thick on plates, sheets

Nickel can be electro-deposited in any thickness from .006 to .002″, regardless of thickness of steel plate or sheet, by recently-announced process. Nickel deposited by process is ductile, pore-free, and adherent. It will withstand heavy forming operations, including flame cutting, and shearing forming.

Plate and sheet steel, clad on one side, ranges in thickness from 14 gage to 1″ or more. Standard sheet sizes are 18 to 84″ wide and 16 to 240″ long. In general, sheet steel is clad with .006 to .008″ of nickel. Plate is clad with .008 to .010″, with a maximum of .020″ of nickel.

(Nickel-clad steel is a product of Bart Mfg. Corp., Dept. CP, 229 Main St., Belleville 9, N. J. . . . or check CP 4029, pages 2 and 3.)

It may help you!

Carpenter Titanium Tubing is light. It's strong. It has a remarkable endurance limit. Weighing about 56% as much as high alloy steel, titanium has a tensile strength that compares favorably with many steels. It possesses an endurance ratio well above both steel and non-ferrous metals.

Carpenter Titanium Tubing is highly resistant to most corrosives, salt water and salt atmospheres. Its extreme resistance to erosion and cavitation is unique among metals. Yet, with all this, Carpenter Titanium Tubing is ductile, may be successfully machined.

Perhaps the advantages of Carpenter Titanium Tubing can help you solve design and production problems. Would you like to know more about it?

THE CARPENTER STEEL COMPANY
Alloy Tube Division, Union, New Jersey

When inquiring check CP 4030 on handy form, pgs. 2-3

Accurate, corrosion-proof Baldwin SR-4® Pressure Cells measure remotely all pumping along 670 mile "Big Inch"

A leading pipe line company depends on accurate, corrosion-proof SR-4 Pressure Cells for remote control of all piping along a new 670 mile 22-inch crude oil pipeline . . . just one of the many ways in which Baldwin SR-4 Cells are being used for fast, accurate and economical measurement of fluid pressure, load and torque. Send today for our latest bulletins! Address Department 3006, Baldwin-Lima-Hamilton Corp., Philadelphia 42, Pa.

BALDWIN-LIMA-HAMILTON
Philadelphia 42, Pa. • Offices in Principal Cities
In Canada: Peacock Bros., Ltd., Montreal, Quebec

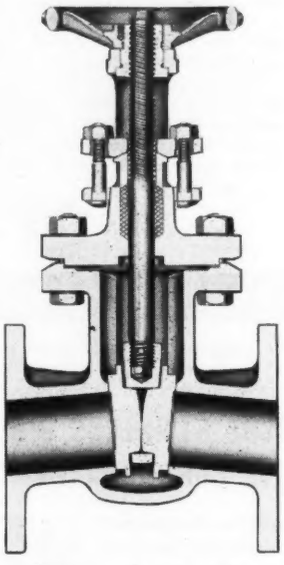
When inquiring check CP 4031 on handy form, pgs. 2-3

Design reduces seat wear in corrosion-resistant gate valves

Uses: Control of corrosive-fluids-flow in lines from ½ to 6″ size.

Features: Split-wedge disc in gate valve is made up of two identical, circular discs placed back-to-back in a carrier. Discs have a convex trunnion on back and an integral circumferential flange which bears on guide slots in valve body.

Since seating load is uniformly distributed over both discs, excessive force is not required for tight seating. There is no danger of buckling discs. Uniform pressure plus freedom of discs to rotate is effective in reducing seat wear and preventing galling of seating surfaces.



Cutaway of gate valve showing split-wedge disc design

Description: In addition to these gate valves, company's line of corrosion-resistant units includes globe and angle valves. These units feature improved disc-stem connections, in which stem extends much further into disc. Disc chatter is eliminated, seat wear reduced.

Materials in which all valves are available are company's 18-8S Mo stainless steel and Craneloy 20 high-nickel, high-chromium stainless steel. Teflon packing is used in all valves.

Valves are furnished with all bolting of stainless. In screwed ends, sizes ½ to 2″ inclusive are available; in flanged ends, sizes ½ to 6″ inclusive.

(Corrosion-resistant alloy valves are products of Crane Company, Dept. CP, 836 S. Michigan Ave., Chicago 5, Ill. . . . or check CP 4032, pages 2 & 3.)

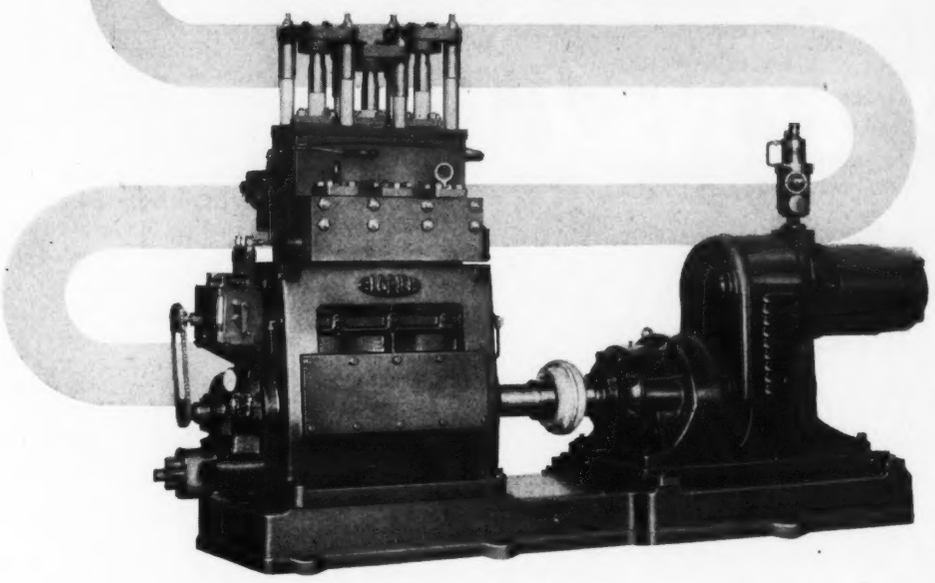
Offers data on titanium foil

Technical data sheet gives composition, physical characteristics, mill limits and process information on commercially pure titanium foil.

Data Sheet 100 is available from the American Silver Co., Dept. CP, 36-07 Prince St., Flushing 54, N. Y. Specify CP 4033, pages 2 and 3.

for your special pumping needs . . .

specify ALDRICH!



Here's an Aldrich Triplex specifically made to pump very highly abrasive slurry that would make short work of most pumps. A typical special Aldrich design, it features solid porcelain plungers—Kennametal ball valves and seats—an oversized oil pump for slow operation. Variable drive is provided by a U. S. Varidrive motor operated by Varitrol automatic control.

Aldrich Pumps are ideal for applications involving corrosion, high viscosity, high pressure, or abrasive materials . . . and the complete range of sizes insures a proper Aldrich pump for every need. Ask for recommendations to meet *your* chemical pumping needs.

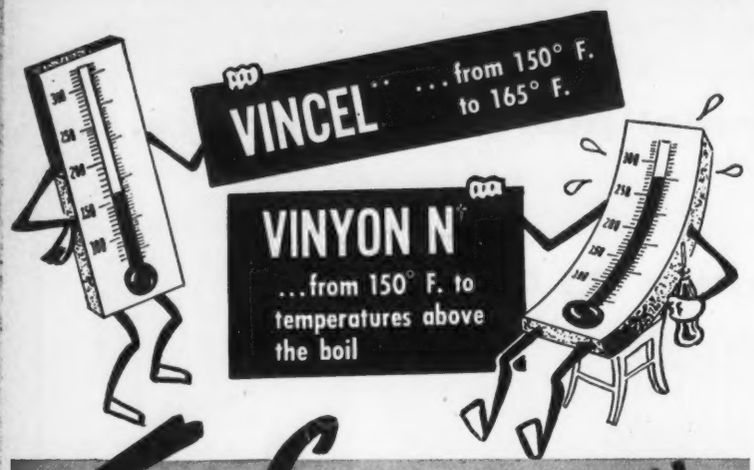
the ALDRICH *pump company*

. . . Originators of the Direct Flow Pump

23 GORDON STREET • ALLENTOWN, PENNSYLVANIA

Representatives: Birmingham • Bradford, Pa. • Boston • Buffalo • Carmi, Illinois • Charleston, W. Va. • Chicago • Cincinnati • Cleveland • Dallas • Denver • Detroit • Duluth Houston • Los Angeles • New York • Oakland, Calif. • Philadelphia • Pittsburgh • Portland, Ore. • Richmond, Va. • Rochester • Salt Lake City • San Francisco • Seattle Somerville, Mass. • Spokane, Wash. • Syracuse • Tulsa • Washington, D. C. • Youngstown • Export: Petroleum Machinery Corp., 30 Rockefeller Plaza, New York 20, N. Y.

When inquiring check CP 4034 on handy form, pgs. 2-3



Tops for broad-range CHEMICAL FILTRATION

NFM VINCEL and VINYON N† are excellent general purpose filter cloths. They are available in a variety of weaves and in any desired standard width from 26" through 72" or as made up filter element covers.**

Over Forty Years of weaving experience have given us the "know how" so necessary to the production of top quality Industrial Filtering Fabrics. We weave all these Synthetic Fiber fabrics: Glass, Nylon, ORLON*, Saran, VINCEL, VINYON N†, DACRON***, POLYETHYLENE and TEFLON††.**

... for your Filter Paper requirements try NETONE Filter Paper. High tensile strength, chemical resistant, high burst factor, abrasion resistant and crease resistant. Send for a test sample.

Write us about your requirements, we'll be glad to send test cloths, if you are not sure which cloth material is best.

††TM for duPont Tetrafluorethylene Fiber
*TM for duPont Acrylic Fiber
***TM for duPont Polyester Fiber
**TM—NFM Reg. U. S. Pat. Off.
†TM—Union Carbide & Chemical Co.

"Excellent Resistance—No Attack" are the operating reports when these filter cloths are used for filtering:

ACIDS

SULPHURIC
HYDROCHLORIC
NITRIC
HYDROFLUORIC
AQUA REGIA

CAUSTICS

SODIUM HYDROXIDE
POTASSIUM HYDROXIDE

and

CHLORINE or BROMINE WATER
SILVER NITRATE
TANNIC ACID
MANY OILS, FATS and WAXES

Weavers of Industrial Filter Media for over Forty Years

The National Filter Media Corp.

General Offices & Mills: New Haven 14, Conn.
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2627 West 19th St.	Roselawn Center Bldg.	1503 Hadley Street	Nicolai Friis	Edward L. Bateman

When inquiring check CP 4035 on handy form, pgs. 2-3

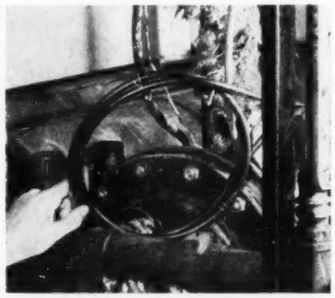
CORROSION CONTROL

Protects instruments from corrosive atmospheres . . .

plastic-covered tube assures constant operation

Constant, accurate temperature recordings are now being maintained through use of a vinyl plastic covered capillary tubing. According to The Foxboro Company, Foxboro, Mass., manufacturer of industrial instruments, vinyl covered tubing connects a sensitive bulb in tank containing heated corrosive liquid to the automatic temperature recorder, giving a continuous feed of process information.

In temperature control, measurements are usually relayed by 1/16" OD copper capillary tubing. This forms part of a sealed system in which filling medium (gas, vapor, or liquid) expands in response to heat. To protect copper tube from accidental crimping or breaking, flexible bronze protective tubing is put over it.



Plastic coating protects capillary tubing of recording instruments

However, corrosive atmospheres and liquids in many plants will quickly eat through bronze, and eventually destroy the measuring system. To prevent such failure, bronze armor is encased in plastic tubing, made from Geon vinyl resin.

This tubing is flexible, safely resists most acids, alkalis, salts, and oils, withstands temps to 200°F.

(Geon vinyl tubing is a product of B. F. Goodrich Chemical Co., Dept. CP, 324 Rose Bldg., Cleveland 15, Ohio. Check CP 4036 on handy form, pages 2 and 3.)

NOW YOU CAN HAVE METERED SURETY IN HANDLING CORROSIVE LIQUIDS

All Stainless Steel Meter

CONTROLS FORMULAS, COSTS, INVENTORIES

Rotocycle meter, cut away to show the all-revolving rotor construction.

Rockwell Model 2-BC stainless steel meters provide indisputable records for the quantities of corrosive liquids used in mixing formulas. They provide basic accounting facts for accurate cost identification; for inventory controls; for tax analysis purposes.

These meters are constructed *inside and out* of stainless steel. Rated capacity 100 gpm. Quantity control registers and electrically actuated remote registration systems are available. Described in bulletin OG-403. Write *Rockwell Manufacturing Co., Dept. A-5403B Pittsburgh 8, Pa.*

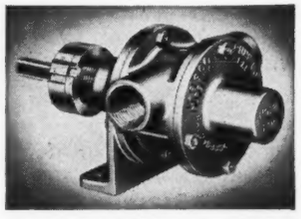
YOU CAN RELY ROCKWELL ON ROCKWELL

ROCKWELL INDUSTRIAL METERS

When inquiring check CP 4037 on handy form, pgs. 2-3

JABSCO STAINLESS STEEL PUMPS SOLVE CORROSIVE PUMPING PROBLEMS

Designed and Engineered for Chemical Applications

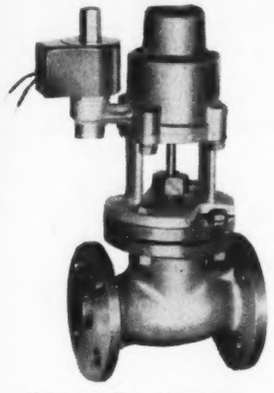


Jabsco's complete line of self-priming, corrosion-resistant pumps answer a multitude of pumping needs. Models 2810 (1" pipe size), 2870 (½"), and 2690 (⅜") have all metallic parts of Type 316 stainless steel. Shafts are supported by oversize, replaceable carbon bearings, stuffingbox type shaft seal with chemical resistant packing. Pumps function perfectly even with dry suction lifts approaching 15', no foot valve is required. When primed, they suck as high as 26'. Jabsco pumps have no metal-to-metal contact, no gears to wear or become noisy. The exclusive "camflexed" Neoprene Impeller is the only moving part. This tough, long-lived, wear resistant impeller is self-lubricated by the liquid pumped. Jabscos are economical, low in first cost, and trouble and maintenance free, even under continuous operation. May be mounted at any angle to pump thin or viscous liquids, and can be operated efficiently at low or high speeds. At 10' head and 1750 RPM, Model 2810 delivers up to 27 GPM, Model 2870 up to 10 GPM, Model 2690 up to 4 GPM. Other stainless steel models also available with ball bearings and mechanical seals. For complete information on how Jabsco can solve your pumping problems, write **Jabsco Pump Company,** 2031 North Lincoln Street, Burbank, California.

When inquiring check CP 4038 on handy form, pgs. 2-3

Body material can be selected for solenoid valve handling corrosive fluids

Almost any corrosive gas or liquid can be handled by company's solenoid pilot-controlled valves, since body material can be selected for particular fluid. Construction can be bronze body and trim, cast iron body and nickel alloy trim, cast steel body and stainless steel trim, Aloyco steel No. 18/s or No. 20 body and stainless steel trim, and Monel body and trim. Other construction materials are also available.



Valve handles almost any corrosive gas or liquid

Standard valves are suitable for either normally open or normally closed operation. They are available with standard, watertight, or explosion-proof solenoid enclosures. Units can be mounted in any position and are provided with full area ports.

Valves require separate source of air, water, or oil for operation. Operating pressure is dependent upon pipe size and auxiliary pressure available.

Cylinder, operated from a separate source, provides ample power to operate valve under most difficult conditions and allows use of stainless steel valve bodies which ordinarily could not be directly operated by a solenoid.

(Solenoid valves are a product of Automatic Switch Company, Dept. CP, 391 Lakeside Ave., Orange, N. J. Check CP 4039, pages 2 and 3.)

Over 3000 articles on corrosion summarized in bibliography

Summaries of 3512 corrosion and corrosion prevention articles, books, and brochures published in 1948-1949 are compiled in 346-page volume. Literature abstracted is classified in eight main groups: general, testing, characteristic corrosion phenomena, corrosive environment, preventive measures, materials of construction, equipment and industries. Each main group is subdivided.

1948-1949 Bibliographic Survey of Corrosion is available at $10 the copy (members NACE) or $12.50 (non-members) from National Association of Corrosion Engineers, Dept. CP, 1061 M & M Building, Houston 2, Texas.

● This photograph shows the welding of Revere 70-30 Cupro-Nickel to make a digester to handle both organic and inorganic acids. The metal was chosen because of its superior corrosion-resistance. It is also widely used for condenser tubes and plates, heat exchangers, evaporators, stills and similar equipment where its enduring qualities are required to meet corrosive fluids such as salt water and many chemicals.

The digester shown was made by the Nooter Corporation, 1430 S. Second St., St. Louis 4, Mo., which is an important supplier to the chemical, refinery, utility and similar industries. Weight of the vessel, 9,000 pounds; length, nine feet, inside diameter, 66 inches. Revere collaborates closely with Nooter from time to time on welding matters. If you have a welding problem on non-ferrous metals, see the nearest Revere Sales Office.

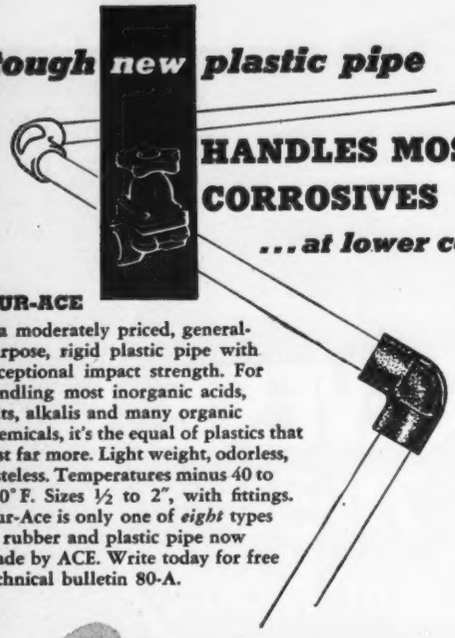
REVERE
COPPER AND BRASS INCORPORATED
Founded by Paul Revere in 1801
230 Park Avenue, New York 17, N. Y.

Mills: Baltimore, Md.; Chicago and Clinton, Ill.; Detroit, Mich.; Los Angeles and Riverside, Calif.; New Bedford, Mass.; Rome, N. Y. Sales Offices in Principal Cities, Distributors Everywhere.

SEE "MEET THE PRESS" ON NBC TELEVISION, SUNDAYS

When inquiring check CP 4040 on handy form, pgs. 2-3

tough new plastic pipe



HANDLES MOST CORROSIVES

...at lower cost

DUR-ACE

is a moderately priced, general-purpose, rigid plastic pipe with exceptional impact strength. For handling most inorganic acids, salts, alkalis and many organic chemicals, it's the equal of plastics that cost far more. Light weight, odorless, tasteless. Temperatures minus 40 to 170° F. Sizes ½ to 2", with fittings. Dur-Ace is only one of *eight* types of rubber and plastic pipe now made by ACE. Write today for free technical bulletin 80-A.

ACE rubber and plastic processing equipment • SINCE 1852

AMERICAN HARD RUBBER COMPANY, 93 Worth St., New York 13, N. Y.

When inquiring check CP 4041 on handy form, pgs. 2-3

Corrosion-Resisting

INCO-CAST FITTINGS

Write for catalog price list!

90° Elbows

Protect product purity

Unions

Available in Monel®, Nickel and Inconel®

Tees

Crosses

All standard types • Pressure tested

Plugs

Full range of sizes • Economical in cost

Withstand high and sub-zero temperatures

Stub ends

Strong, sound, tough castings

Flanges

Reducing tees

Yours for the asking—Catalog Price List

The International Nickel Company, Inc.
67 Wall Street
New York 5, N. Y.

When inquiring check CP 4042 on handy form, pgs. 2-3

handling acid spray, this silicon carbide nozzle...

Outlasts metal 30 to 1

Metal spray nozzles used in an SO_2 recovery process averaged less than two-months life. Although they had a complex internal design (to give turbulence), it proved practical to mold the nozzles from CARBORUNDUM's silicon carbide refractory.

The original silicon carbide nozzles went into service five years ago. Except for two or three broken during lining repairs they are *still in use!* This, in spite of severe corrosion and extreme heat shock (gases are 150 F inside and 1700-1800 F outside the nozzles) — conditions that cause quick failure of most commonly used refractories.

Whenever you are investigating materials of construction to stand conditions like these, you should look into the possibilities of silicon carbide as well as high temperature alloys. Practically all these refractories are available in special shapes molded to close tolerances. For further information write Department S-124, Refractories Division, The Carborundum Company, Perth Amboy, N. J.

CARBORUNDUM

Registered Trade Mark

When inquiring check CP 4043 on handy form, pgs. 2-3

Even tanks in critical condition can be saved by combination metal-organic coating . . .

resin sealer and sprayed metallic aluminum resist corrosion and abrasion

A major problem in the maintenance of a petroleum refinery is metal loss resulting from continual oxidation and abrasion through action of an open-top, floating-roof tank. Sprayed metallic coatings whose porosity is sealed with an organic resin have been found to give lasting service with no rusting whatsoever. Costs are low per service year — estimated at about ten cents per year per square foot of surface — and possible product contamination and expensive downtime are eliminated.

Three alternatives are open when the shell of the floating roof tank approaches the minimum thickness of steel allowable. First, another type of tank can be utilized. However, with another tank (such as the standard cone-roof API tank), loss of light ends which are prevalent in the vapor phase can amount to significant monetary loss per barrel of crude refined. Loss is directly proportional to the number of times the tank is filled and emptied.

Second, the floating roof tank can be allowed to rust and plates replaced when critical minimum shell thickness is reached. However, there is the problem of possible product contamination when accumulated rust is washed off the roof. In addition, costly downtime accrues in cleaning sludge and replacing thin plates.

Third, a floating roof tank can be used effectively with no downtime or product contamination, if rusting can be stopped by use of a protective coating on the shell. Organic coatings alone are not suitable because abrasive action of moving roof wears them off. However, sprayed metal will resist the abrasive action of roof movement and an organic resin sealer can be chosen for its resistance to breakdown by petroleum products.

Where acid conditions prevail, because of industrial

Charles Morris photo

Sprayed metallic coatings give lasting protection at low cost per service year

Corrosioneering News

Quick facts about the services and equipment Pfaudler offers to help you reduce corrosion and processing cost.

Published by The Pfaudler Co., Rochester, N.Y.

Pfaudler Acid-alkali-resistant Glass Now Standard on Glassed Steel Units!

On September 1, 1954, acid-alkali-resistant glass became standard for all Pfaudler glassed steel equipment for severe chemical service. This new glass was first introduced to the chemical industries in November, 1951, and has been available as "special" since then.

Exceptional Corrosion Resistance

Wide and varied field experience over the past three years fully verified the original expectations for this glass—it has acid resistance equal to or better than the previous standard glass and, in addition, it is *three times as resistant* to alkaline solutions.

Specifically, this glass is resistant to corrosion by all acids (except hydrofluoric), even at elevated temperatures and pressures, and to alkaline solutions up to pH 12 and 212°F.

10% Price Reduction

As "special," acid-alkali-resistant glass carried a 10% premium charge over the former standard glass. Now as a standard, this premium is eliminated and it will be available at no increase in price.

Identification

Acid-alkali-resistant glass, like the former standard, is deep blue in color. For easy identification, there is a glass number on the name plate of every Pfaudler vessel. At present, the number "53" is used to designate the new standard glass; "42" designates former standard. A new numbering system is now in process. Details later in "Corrosioneering News."

Both of these glassed steel discs were exposed to buffered caustic soda (pH 11.5) at 212°F. for 30 days. Acid-alkali-resistant glass (left) was unaffected.

Note how the high-quality glass which was formerly used in Pfaudler glassed steel vessels was severely etched.

Field Experience "proves in" acid-alkali-resistant glass

A 1000-gallon oxidation kettle, lined with acid-alkali-resistant glass, was placed in use 3½ years ago, processing sodium hypochlorite bleach containing 12-15% free chlorine. It produced 3,694 batches before showing noticeable wear. This is more than three times as many batches as were possible with regular high-grade Pfaudler glass.

Pfaudler announces new "UTILITANKS"— glassed inside and out for storage

These new low-priced Pfaudler UTILITANKS have a smooth, non-oxidizing glass surface inside and out. On the inside, this glass protects your product from contamination because glass will not oxidize, flake or deteriorate with age.

Cleaning is easy, too, because Pfaudler glass is smoother than the most highly polished stainless steel, and practically nothing sticks to it. Just hose it down.

On the outside, the glassed surface means you never have to paint the tank. It won't rust. Over the years, you'll save hundreds of dollars in upkeep costs.

Beneath these glassed surfaces is a rugged carbon steel tank which gives you the structural strength necessary for day-in, day-out use. The glass is not simply a coating or layer of enamel—it is actually *fused* to the steel in Pfaudler's furnaces at 1600°F. This results in a bond of interlocking glass and steel so strong that our tests could not separate them with a pull of over 1500 lbs./sq. in.

Low-cost Storage

UTILITANKS are low in cost. To keep costs low, we've left off fancy gadgets and used a glass with mild corrosion resistance perfectly suited for neutral products like paint, wax, antifreeze, ink, liquid sugar, etc. Sizes range from 1000 to 5000 gallons, and your initial investment can run as low as 50¢ per gallon.

You'll want to see Bulletin 916 which tells what products may be stored in UTILITANKS, what sizes are available, what they weigh and what features are provided as standard. Write for it today.

"UTILITANK" *is a trade-mark of The Pfaudler Co.*

New UTILITANK never requires painting because it's glassed inside *and* out. Sides extend all the way to the ground, eliminating leg supports. No cleaning under the tank. Sizes range from 1000 to 5000 gallons and over-all cost can run as low as 50¢ per gallon.

SOLVENT RECOVERY—big dividends for small investments

Many production men have discovered a gold mine right at their own back door, in the form of recoverable solvents. By installing a Pfaudler solvent recovery system they have greatly reduced processing costs. The equipment quickly pays for itself.

Of course, your solvent recovery problem may be unique in itself, requiring the services of Pfaudler process engineers to work out an economical solution.

Recovery Systems Pay Off

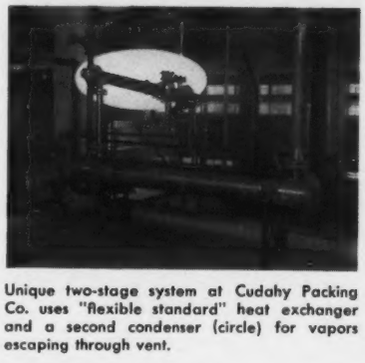
Two typical examples of solvent recovery systems worked out successfully in this manner are those at Armour Laboratories and Cudahy Packing Co.

At Armour, the problem was to recover alcohol used in making biologicals, and to prevent contamination of the recovered alcohol. The solution: Pfaudler designed, built and installed an all-stainless system with a 53-ft. distillation tower, that is providing exactly the quality and quantity of recovered alcohol required by Armour's specifications.

The Cudahy problem had a few different wrinkles. To recover a highly volatile, expensive solvent, it was necessary for Pfaudler process engineers to develop a two-stage system. This included a large, stainless steel heat exchanger to recover most of the solvent, and a small, refrigerated unit to condense escaping vapors.

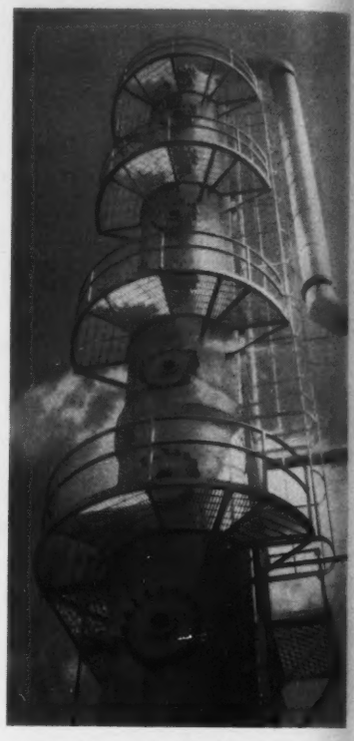
Fast Delivery

Delivery on these systems is amazingly fast—sometimes as quickly as 4 weeks, because of Pfaudler's policy of using "flexible standard" units wherever possible. These are economical standard designs which incorporate the most often needed "custom" features. If necessary, they become the "building blocks" for further custom fabrication.



Unique two-stage system at Cudahy Packing Co. uses "flexible standard" heat exchanger and a second condenser (circle) for vapors escaping through vent.

Better check on *your* solvent recovery program. It will pay you to talk it over with Pfaudler. Drop us a line and we'll be glad to answer your questions.



This 53-ft. distillation tower is part of the Pfaudler-engineered alcohol recovery system at Armour Laboratories.

Steel discs (inset) were glassed together and connected to crane, where they supported full weight of 5½-ton truck.

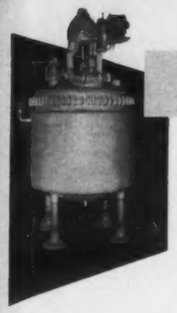
Dramatic demonstration proves strength of Pfaudler glass-to-steel bond

This truck, weighing 11,000 pounds, is supported entirely by two small steel discs, 4″ in diameter, locked together by Pfaudler glass. Bonded to the face of each disc, this glass was fired on at the same temperature used in manufacturing Pfaudler glassed steel reactors, and other processing equipment. Chemical action during the firing locks glass and steel together.

Withstands Pull of Over 1500 lbs.

Subsequent tests on these discs indicated we could probably have supported *two* of these trucks without damaging the glass-to-steel bond. In these tests, it withstood a pull of over 1,500 lbs./sq. in.!

In your plant, this means you can have all the corrosion resistance of Pfaudler glass, *plus* the working strength of steel. Your processing equipment will stand up under hard day-to-day use, while on the inside it pampers delicate products or shrugs off corrosive attack.



TECHNICAL TALKS

A BAFFLING DISCOVERY

This agitation system uses its fingers to give you top speed and thorough mixing

You can pour oil and water into a Pfaudler glassed steel reactor, and get a 100% emulsion in minutes. Twenty years ago, it would have taken hours or you couldn't have done it at all.

The forward steps we have taken in agitation have led to a number of questions in the minds of chemical manufacturers. Questions like, "What position is best for the baffle?", "What kind of an impeller does the best job?"

We first heard such questions back around 1932. That year, a chemical manufacturer asked if we could stop "dragging our anchor," and start giving him the violent agitation he needed for his gas absorption problem. The anchor agitators we had been using just couldn't do the job.

Advent of Impeller

So we started toying around with extra blades on the anchor agitator. This rig was supposed to run at 90 RPM, and the engineers' slide rules said there was no reason why it wouldn't.

We tried it out. The shaft whipped and vibrated, and we didn't get the turbulent agitation we wanted.

That's when we developed impellers, and went seriously into the studies that produced Pfaudler agitation as it is known today.

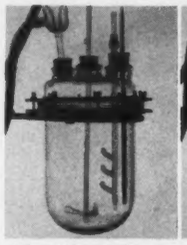
We replaced the anchor with a three-bladed impeller. This gave us a greater shear, and provided the violent agitation desired. But all the liquid in the vessel began to move as a body, and ended up with a swirling effect, very little mixing.

We broke up this merry-go-round with baffles, and—Eureka!—there was the answer. Good turbulence, activity throughout the vessel, and plenty of intermolecular contact! Our chemical customer was satisfied, and we had added immeasurably to the industry's knowledge of agitation.

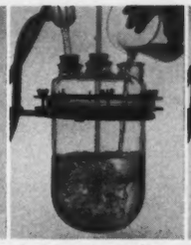
Like a Pump

This is basically what Pfaudler agitation consists of: a simple three-blade impeller operating close to the bottom of the vessel, so that the bottom head acts as half the impeller casing of a pump, producing a complete general agitation of almost any character. Baffles provide turbulence throughout the vessel.

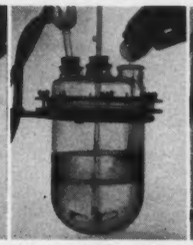
If you've a problem in blending, suspension, emulsion, or other agitation, you can easily profit from our experience. A note on your letterhead will bring a packet of helpful data from us.



Laboratory equipment set up to show how a synthetic latex is made. The equipment is made to the exact scale of Pfaudler glassed steel plant production polymerizers.



First step in making a latex is the addition of a monomer, which later hardens to form the solid part of the latex. Note thoroughness of mixing action.



Next step is the addition of an emulsifier, or soap to effect mixing of oil and water. This material is similar to the detergents commonly used for dishwashing.

The agitator breaks monomer into tiny droplets. Heat causes the droplets to polymerize, while in suspension. Polymerized particles stay in suspension for long periods.

A VEST-POCKET LATEX FACTORY

Special laboratory equipment is exact scale-down of Pfaudler equipment used in actual production

One of our customers faced the problem of scale-up from laboratory synthesis of latex to a full-size producing plant.

The mountain came halfway to Mahomet, when the engineers chose Pfaudler glassed steel vessels which had the same properties of corrosion resistance and adhesion resistance as laboratory glassware.

And Mahomet came halfway, too. To duplicate Pfaudler agitation, glass models were made of the Pfaudler vessels for laboratory use. These were exact scale-downs—right to impeller shape and the fingers on baffles.

Thus, the customer was positive that the success they had in the laboratory would be duplicated when they went into production.

How glassed steel assembly provides multiple use of a single nozzle

The fewer nozzles you have on a reactor or other vessel the better, particularly when you're operating under pressure or vacuum.

Here is a recently developed Pfaudler assembly which gives you multiple use of a single nozzle, eliminating the cost of adding extra nozzles for sight glasses, or for the introduction of several liquids.

This assembly is a combination of 2″ return bends, and can be attached directly to a 2″ flanged opening. All liquids drain freely and rapidly, with no pockets to impede the flow.

There are two observation glasses, each 3″ in diameter, and porcelain funnels are also available to concentrate and direct liquid flow. We'd be glad to quote price or tell you anything more you want to know about this nozzle.

You can introduce up to *four* separate liquids by means of this single glass-lined arrangement, which has a sight box to help you observe the flow.

HEAT EXCHANGERS

Wise choice of design will give you better results at a lower price

There was a time when you could get by with the same type of exchanger for practically every process, but today's higher temperatures, higher pressures, corrosive chemicals and continuous processes have changed all that.

Careful engineering is needed to equip you with exactly the right type of heat exchanger for efficient heat transfer and durable equipment.

To give you these advantages, Pfaudler corrosioneers can draw upon a wide variety of designs and materials.

Old Stand-by

For many years, the basic heat exchanger recognized by the Tubular Exchanger Manufacturers' Association (TEMA) was the Class "R" unit, an internal floating head design, primarily for refinery use. It has two major disadvantages to chemical processors. First, the heavy hub flange construction is not economical when high-priced alloys are the materials of construction. Second, internal leakage could occur between the shell and tube sides at the floating head joint without your seeing it from the outside.

More desirable to chemical applications are the Class "C" and Class "A" exchangers. Class "C" is for carbon steel and nonferrous units, and Class "A" covers the high alloy units. Except for this distinction, these exchangers are almost identical in design.

Lower Costs

You save money with either of these two types, because they have Vanstone flanges for economical alloy construction. And to eliminate the old problem of internal leakage, you can use a packed floating head or fixed tube sheet instead of the internal floating head of the Type "R" unit.

In cases where you cannot use stuffing boxes, there are two solutions: Either use a Class "C" or "A" chemical type internal floating head or fixed tube sheet unit or, if straight tubes are not essential, use the Pfaudler U-bundle type unit.

Advantages of Fixed Tube Sheet

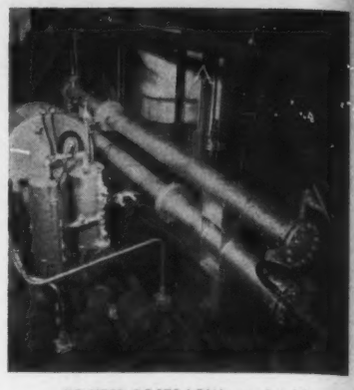
If you do not want to remove the tube bundle for cleaning, Pfaudler's fixed tube sheet unit will give you good service. It's designed for use where temperature differences on shell and tube sides are small, and within that limitation it provides wide versatility. It's easy to clean the tubes, simple in design; this exchanger is the money-saving workhorse of many a chemical plant.

Atomic Exchangers

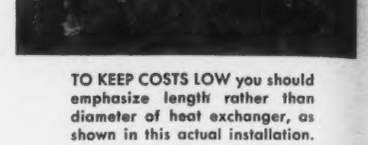
If you were to visit us at Pfaudler, you'd hear some pretty exciting things in our engineering department. Now they're talking about the new problems that have sprung up in the field of nuclear energy. What materials and designs do you use when you're handling transfer of atomic-fission heat? As an example, with the use of liquid metals, you have a fluid which because of its high thermal conductivity transfers most of its heat by pure conduction even though it is in turbulent flow.

This sort of thing simply means we set aside the old books and start writing some new ones.

But that's *our* problem. Right now, we're just as interested in solving *your* heat exchanger problem. For this, the books are written, the materials are at hand, and all we need is the nod from you . . . a letter outlining your needs will do the trick.



TO KEEP COSTS LOW you should emphasize length rather than diameter of heat exchanger, as shown in this actual installation.



Pfaudler Type "FTS" fixed tube sheet unit is the workhorse of the chemical processing industries.

Pfaudler
Corrosioneering News
Published by The Pfaudler Co., Rochester, N. Y.

Designers and fabricators of glassed steel and alloy equipment for the chemical processing industry. Factories in: Rochester, N. Y.; Elyria, Ohio; Leven, Fife, Scotland; Schwetzingen-Baden, Germany; Kobe, Japan.
Sales offices in all principal cities of world.

The Pfaudler Co., Dept. CP-11, Rochester 3, N. Y.
Please send me information on:
- ☐ New acid-alkali-resistant glass
- ☐ New Pfaudler UTILITANKS
- ☐ Solvent recovery systems
- ☐ Pfaudler agitative system
- ☐ Glassed steel multiple-inlet assembly
- ☐ Heat exchangers

Name.....
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Company.....
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atmosphere or specific operations, sprayed metallic aluminum has been used as a base. Both vinyl and Saran resin coatings have been used as sealers. The sealer is sprayed as prescribed over a three to five mil thickness of metallic aluminum. Part of sealer is absorbed by aluminum.

The importance of this coating system lies in the fact that even though the sealer coat is worn off by abrasive action, balance of organic coating remains because it is embedded in the aluminum. Of course, service life is dependent on use of tank, but one case history indicated that even the organic sealer coat showed little sign of wear in a year, when the tank was filled and emptied every other day.

Expected service life can only be estimated, but usual causes of coating failure are prevented with the utilization of this system.

However, even if system should fail completely, then and only then, does loss of steel begin. At this time, tank can be resprayed. Therefore, continuous protection is a definite possibility. Conservative estimates indicate that protection, without any maintenance costs during the period, should be from eight to twelve years.

(Information on sprayed metal coating system courtesy of Protective Coatings Div., Metalweld, Inc., Dept. CP, Scotts Lane & Abbotsford Ave., Philadelphia 29, Pennsylvania . . . or for more information reader may simply check CP 4044 on the convenient Reader Service slip which is located between pages two and three.)

Wrought iron gives protection at sewage treatment plant

Technical description of corrosive services in which wrought iron is used to guard against premature failure is included in case study of sewage treatment plant. Services described are: digester coils, gas lines, engine exhaust lines, steam supply and condensate lines.

Last page of booklet contains basic reasons for selection of wrought iron in sewage plant services and provides a checklist of applications in which material is specified.

Case Study 101, outlined above, is available from Engineering Service Department, A. M. Byers Company, Department CP, Clark Building, Pittsburgh, Pennsylvania. When inquiring reader may simply check CP 4045 on the convenient Reader Service slip located between pages 2 and 3.

For more information on product at left, specify CP 4046 . . . see information request blank between pages 2 and 3.

Another new development using

B. F. Goodrich Chemical *raw materials*

B. F. Goodrich Chemical Company does not make this feeder. We supply only the Geon resin for the rigid vinyl plastic.

All rigid vinyl feeder handles sulfuric acid 24 hrs. a day

THE feeder shown here supplies a steady flow of concentrated sulfuric acid to a production process. It is in use 24 hours a day, 7 days a week, yet has required no maintenance or repairs after more than 6 months of this severe service.

This marvelous record of trouble-free operation is due to the outstanding corrosion resistance of Geon rigid vinyl from which all parts of the feeder, except the motor, are made. Similar feeders made from other materials frequently broke down in service causing production delays and creating hazards to operating personnel.

This success story of Geon rigid vinyl is one of many in which this unique material is setting new records in industry for handling corrosive materials. Furthermore, Geon rigid vinyl is tough, strong and has excellent electrical properties.

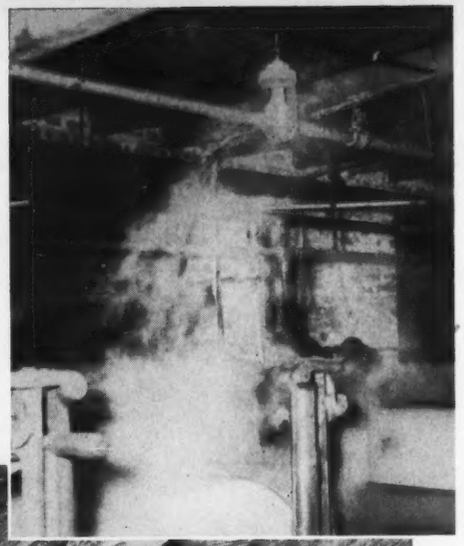
This all rigid vinyl feeder may give you an idea for an equally successful application. There are scores of uses for Geon vinyl materials—from rigid sheets and panels to flexible upholstery, wire insulation, vinyl sponge and many more. Helpful technical information is yours for the asking. Please write Dept. GF-6, B. F. Goodrich Chemical Company, Rose Bldg., Cleveland 15, Ohio. Cable address: Goodchemco. In Canada: Kitchener, Ont

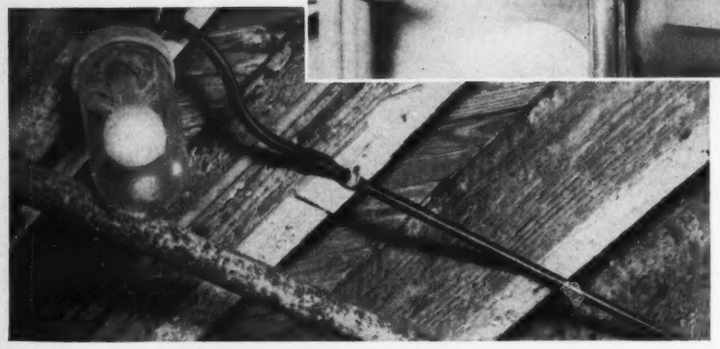
GEON RESINS • GOOD-RITE PLASTICIZERS . . . the ideal team to make products easier, better and more saleable.

GEON polyvinyl materials • HYCAR American rubber • GOOD-RITE chemicals and plasticizers • HARMON colors

When inquiring check CP 4047 on handy form, pgs. 2-3

How to Rescue dollars from corrosion





● Some plants take it for granted that in corrosive atmospheres electrical raceways have to be replaced frequently. Under highly corrosive conditions, sometimes it's a matter of every few months. And it's costly.

B and B Piece Dye Works of New York was using galvanized conduit. Despite painting every year, conduit pitted, rotted, had to be replaced. The problem has been licked by putting electrical circuits in Republic "Dekoron-Coated" Electrical Metallic Tubing. This gives double protection against fumes and steam. The protection of zinc-coated steel, plus a plastic armor of polyethylene.

Installation is easy. Threadless connections between lengths are protected by vinyl or plastic tape. Raceways are protected from end to end.

The result? Raceways that last a lot longer and cost a lot less, especially where operating conditions are extra hard on conduits. Booklet DEK-1 lists corrosive materials that can't affect "Dekoron-Coated" E.M.T., also tells how to install it. Write for your free copy.

REPUBLIC STEEL CORPORATION
Steel and Tubes Division
205 East 131st Street, Cleveland 8, Ohio
GENERAL OFFICES • CLEVELAND 1, OHIO
Export Department: Chrysler Bldg., New York 17, N.Y.

Republic
REPUBLIC STEEL
ELECTRUNITE
"Dekoron-Coated" E.M.T.
LIGHTWEIGHT THREADLESS RIGID STEEL RACEWAY

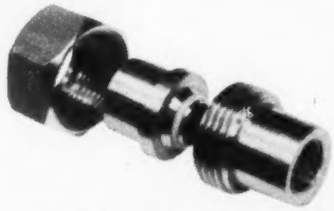
When inquiring check CP 4048 on handy form, pgs. 2-3

Vacuum or high-pressure applications suitable for pipe fittings

Uses: Screw-thread fittings in corrosive service.

Features: Double-sealing action of corrosion-resistant fittings makes them particularly adaptable to both high-pressure and vacuum applications. In addition to conventional metal-to-metal seal, each fitting is equipped with a Teflon sealing ring to further guard against fluid or gas losses.

These pipe fittings have been hydrostatically tested to 20,000 psi, and to 500 psi, pneumatic pressure, without showing any leakage or sign of failure.



Fittings have been hydrostatically tested to 20,000 psi

Description: Screw-thread pipe fittings are available in a wide range of alloy metals such as stainless steel, Monel, and nickel. Included in line are elbows, tees, unions and connectors for pipe from ¼ through ¾".

(Corrosion-resistant pipe fittings are a product of The Special Screw Products Co., Dept. CP, 5445 Dunham Road, Bedford, Ohio . . . check CP 4049, pages 2 and 3.)

Tabulates special data on technical cements

Technical data and application information on company's line of cements and compounds are listed in four-page data sheet.

Master chart on technical cements is available from Sauereisen Cements Company, Dept. CP, 1049 N. Canal St., Pittsburgh 15, Pa. When inquiring specify CP 4050, pages 2 & 3.

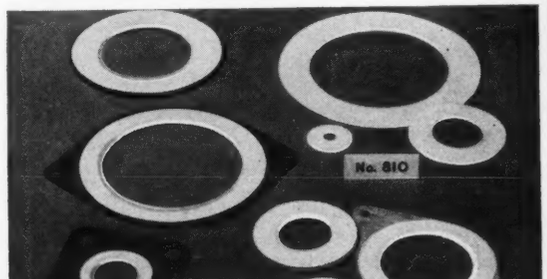
INDUSTRIAL PAINT INDEX
HOW TO SELECT THE RIGHT PAINT FOR EVERY MAINTENANCE NEED
THE TROPICAL PAINT & OIL CO. • CLEVELAND 2, OHIO, U.S.A.

Free!
PAINT INDEX

Your own guide to what kind of paint to use for every heavy-duty job. Gives you the benefit of our accumulated experience . . . 70 years of *specializing* in industrial maintenance paints. Write for your *free* copy TODAY!

TROPICAL PAINT COMPANY
1128-1292 W. 70th • Cleveland 2, Ohio
HEAVY-DUTY MAINTENANCE PAINTS SINCE 1883

When inquiring check CP 4051 on handy form, pgs. 2-3



R/M Teflon* Gaskets
are ideal for chemical use

Protect your costly equipment with R/M "TEFLON" Gaskets. They are not affected by any industrial chemicals or acids. They are resilient and conform to rough and out-of-line flanges. Two types are shown above: R/M Nos. 800 and 802, envelope gaskets for light flanges with low bolt loads; and R/M No. 810, solid rings for standard ring type flanges. See your R/M distributor for details.

**Du Pont's trade-mark for its tetrafluoroethylene resin*

R/M **PACKINGS**
RAYBESTOS-MANHATTAN, INC.
PACKING DIVISION, MANHEIM, PA.

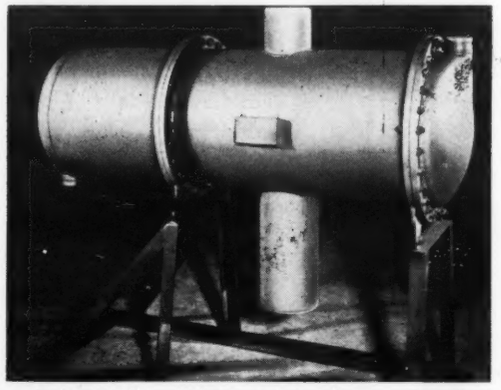
When inquiring check CP 4052 on handy form, pgs. 2-3

Corrosion-resistant unit filters, separates water and solids from gasoline

Uses: For removing water or solid particles 5 microns or larger from aviation gas, and jet fuels.

Features: Filter-separators are built of corrosion-resistant material. Units deliver fuel 99.99% water-free and 98% solids-free.

Description: Materials used for construction were wrought Ampco metal Grade 8 for shell, heads, and pipe; Ampcoloy Grade A3 centrifugally cast for flanges, and Ampco-Trode Grade 10 welding wire for joining. Materials were chosen because of their high strength and corrosion-resistance, as well as good weldability properties. Ampco Grade



Fuel enters filter-separator on left end, passes through unit where water and solids are removed

8 supplied in plate form for fabrication has minimum tensile strength of 72,000 psi, yield strength of 38,000 psi, and elongation of 35%.

Heads were formed cold in three operations from 3/16" thick plates hand formed by die pressing and then extruded. Interstage annealing was performed between operations.

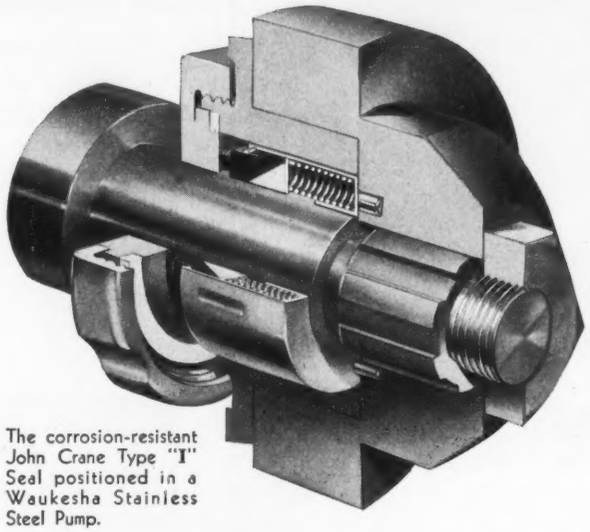
In operation, fuel at rate of 225 gpm enters hose connection to left of picture. Fuel passes through pre-packed excelsior cartridge where entrained water is coalesced into droplets. By gravity, droplets settle into water drain leg.

Right hand section of vessel contains filter element assembly, which removes solid contaminants down to five microns in size. Vertical extension near center of shell is housing for air eliminator mechanism. Clean effluent from filter-separator discharges vertically through right hand hose coupling.

(Ampco Grade 8, Ampcoloy Grade A3, and Ampco-Trode Grade 10 are products of Ampco Metal, Inc., Dept. CP, 1745 S. 38th St., Milwaukee 46, Wis. Check CP 4053 on handy form, pages 2 and 3.)

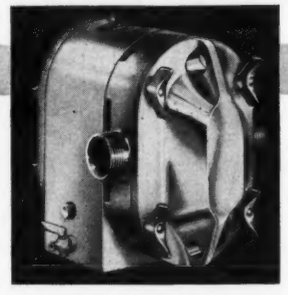
(Filter-separator unit was manufactured by Warner Lewis Co., Div of Fram Corp., Dept. CP, P. O. Box 3096, Tulsa 8, Okla. Check CP 4053A, pgs. 2 & 3.)

The P. D.* Pump for the chemical and petroleum industries



The corrosion-resistant John Crane Type "I" Seal positioned in a Waukesha Stainless Steel Pump.

the seal of toughness



Waukesha Stainless Steel Pump for the Chemical Industry—one of a broad line of quality positive displacement pumps.

. . . in corrosion-resistant pumps

Designed for a "tough" pumping job in the chemical industry where volatile, corrosive, or hot materials are being transferred is the Waukesha positive displacement pump with the spring-loaded, John Crane Rotary Seal. Incorporating carbon, ceramic, and teflon, this seal is recommended for non-abrasive products having corrosive properties.

Waukesha positive displacement, corrosion-resistant, stainless steel pumps are renowned for their precision performance and dependable operation in many industries. These pumps require a minimum of time to dismantle, clean and assemble. They are easy to wash and sterilize . . . a valuable asset where pumps are used to handle various products one after another. Write Waukesha, today, for complete details.

* The Waukesha Positive Displacement Pump of Stainless Steel.

Waukesha Foundry Company
Waukesha, Wisconsin

When inquiring check CP 4054 on handy form, pgs. 2-3

"MIGHTY MITE" SOLVES CHEMICAL PUMP PROBLEMS

The Eco All-Chem Pump is the All-Teflon and stainless steel pump that handles 70 percent of corrosive chemical requirements in Lab., pilot plant and small volume pumping in production service.

Simplify selection; standardize on fewer types, models, sizes; minimize maintenance problems.

READ THE SPECS . . . SPECIFY AND TRY

- *Type Pump:* Positive displacement with two opposed axially oscillating impellers equivalent to duplex piston operation.
- *Volume:* ½ to 10 g.p.m. at 1750 RPM (water).
- *Pressures and Temperatures:* Now up to 100 psi. and 212°F. due to improved impeller design and molding technique.
- *Suction Lift:* Highest over widest temperature and viscosity range.
- *Corrosion Resistance:* Lowest corrosion rate due to internal flow pattern.
- *Pump Operating Characteristics:* Linear delivery. No air entrainment. Non-foaming. Unequalled for safety in handling hazardous liquids such as nitric acid and hydrogen peroxide. Self-priming on non-volatile liquids.
- *Drive:* Applicable to direct motor drive at 1750 RPM, as well as to all other standard driving methods.

All-Chem PUMPS **ECO**

ENGINEERING COMPANY

12 New York Avenue • Newark 1 • New Jersey

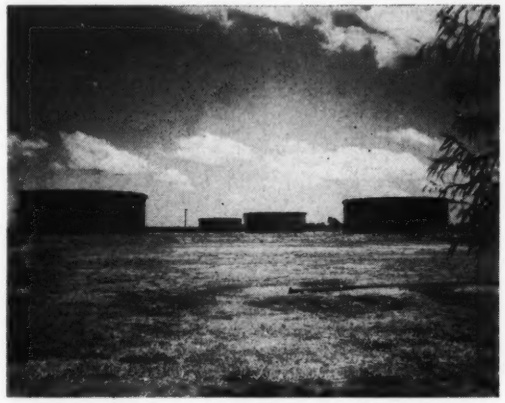
When inquiring check CP 4055 on handy form, pgs. 2-3

Cities Service protects roofs of seven 120,000 bbl tanks with zinc coating . . .

resists sunlight, moisture, severe weathering, and hydrogen sulfide fumes

Problem: Conventional coatings used on cone roof tanks of only 3″ pitch at Cities Service Pipe Line Company, Sour Lake, Texas, failed rapidly.

One reason former coatings failed in a short time was due to severe weathering caused by frequent rainstorms, which left water standing in low spots on decks until evaporated by the sun. Temperature of roofs often reaches 150°F, increasing corrosion rate of the steel. In the case of three of the tanks,



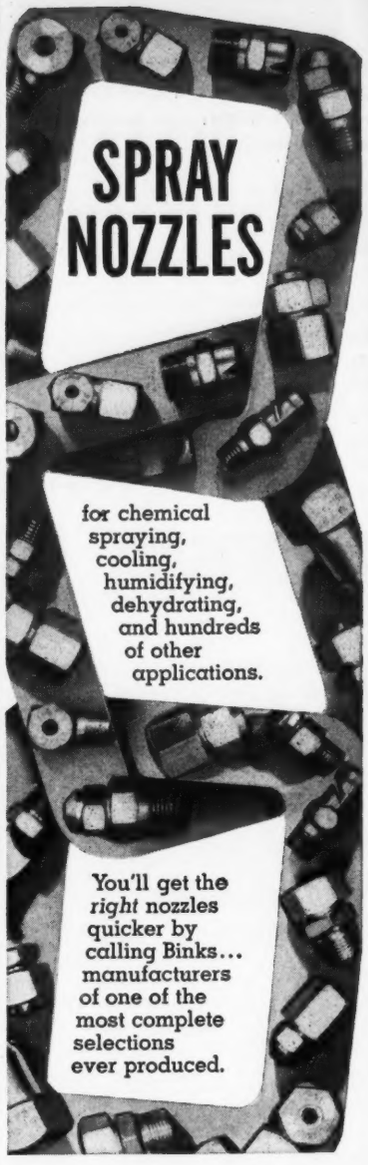
Coating on the roofs of these sour crude tanks must withstand H_2S and adverse weather conditions

used for storage of sour crude, corrosion problem was made more severe by the presence of hydrogen sulfide fumes. Tests of water on roofs indicated a pH of 4 or less in many instances. Combination of sunlight, moisture, weather, and hydrogen sulfide made this a terrifically tough exposure for any coating.

When seven new 120,000 bbl floating roof tanks were added, it was decided to try a coating other than the conventional oil base product.

Solution: Nearly two years ago a zinc coating, known as Dimetcote, was applied to the tank roofs. Coating is unique in that it contains no organic binders. It arrives at the job site as two materials, which are mixed together just before use. One gallon (23 lb) of finely divided zinc powder is mixed with two-thirds of a gallon of a water solution of silicates to yield one gallon of coating.

One coat of material was sprayed on sandblasted steel surface of a thickness of 2.5 mils. After application, coating was cured by treating with D-3 Chemical Curing Solution. Since ample protection is provided with one coat, considerable labor saving results during application.


SPRAY NOZZLES
for chemical spraying, cooling, humidifying, dehydrating, and hundreds of other applications.
You'll get the *right* nozzles quicker by calling Binks... manufacturers of one of the most complete selections ever produced.

A wide range of spray patterns, sizes, capacities...with nozzles cast or machined from standard or special corrosion-resistant metals.

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Binks MANUFACTURING CO.

A COMPLETE LINE OF INDUSTRIAL SPRAY NOZZLES AND COOLING TOWERS

When inquiring check CP 4056 on handy form, pgs. 2-3

View of one storage tank shows that coating is still in good condition after two years service

Results: Since its application nearly two years ago, coating has performed so satisfactorily in this service that six new tanks identical to those described, which are currently being constructed by Cities Service Pipeline Co. at Houston, Texas, will also have their roofs coated with the material.

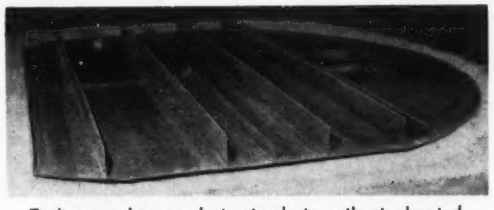
(Dimetcote is a product of Amercoat Corp., Dept. CP, 4809 Firestone Blvd., South Gate, Calif. . . . or Calif. Check CP 4057, pages 2 and 3.)

Plastic makes tank cover light and resistant to corrosives . . .

special openings and outlets easily furnished

Uses: As covers for acid process tanks installed either indoors or outdoors.

Features: In addition to being light, covers have excellent resistance to corrosion and good structural strength at elevated temperatures.



Tank cover has good structural strength at elevated temperatures

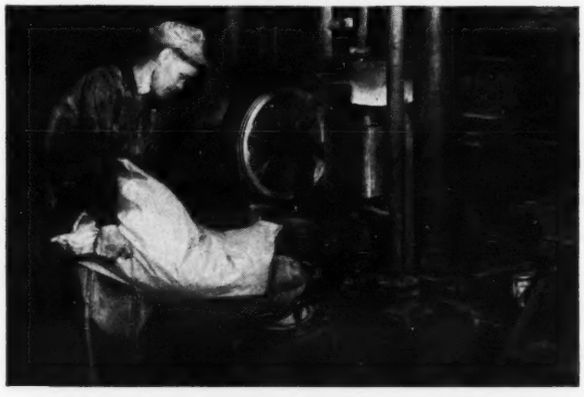
Description: Acid tank covers are manufactured from company's Rigidon glass-reinforced, polyester resin plastic material. They are available in sizes up to 18′ in diameter. Special openings and outlets are easily furnished as required.

(Acid tank covers are a product of Heil Process Equipment Corp., Dept. CP, 12901 Elmwood Ave., Cleveland 11, Ohio. Check CP 4058, pages 2 & 3.)

These Alloys Can Really Handle Hot Acids

SAVES $25,000 A YEAR—Agitator sweeps and shafts made of HASTELLOY alloy B mix a corrosive and erosive mineral slurry containing 6 to 80 per cent sulphuric acid. The alloy's corrosion resistance has resulted in a maintenance saving of $25,000 a year. →

←**SAVES $5,000 YEARLY**—HASTELLOY alloy C charging baskets have decreased maintenance by 90 per cent on this job. They resist oxidizing and reducing conditions caused by acid salts in a solution of hot sulphuric acid.



←**4 YEARS IN HOT H_2SO_4 AND HCl** Propellers, shafts, thermometer wells, and blow-off lines formerly used on this dye kettle had to be replaced every three months. HASTELLOY alloy D parts used in the same severe service are still good after four years.

HASTELLOY *alloys can help solve your corrosion problems, too. For further information, contact the nearest Haynes Stellite Company office listed below.*

HASTELLOY *alloys*
TRADE-MARK

Nickel-base, corrosion-resistant alloys available as sheet, plate, bar stock, welding rod, welded tubing and pipe, cast pipe and pipe fittings, sand and precision-investment castings.

"Hastelloy" is a registered trade-mark of Union Carbide and Carbon Corporation.

Haynes Stellite Company
A Division of
Union Carbide and Carbon Corporation
UCC
General Offices and Works, Kokomo, Indiana
Sales Offices
Chicago — Cleveland — Detroit — Houston
Los Angeles — New York — San Francisco — Tulsa

When inquiring check CP 4059 on handy form, pgs. 2-3

ATLAS NEOBON® NEELIUM® ZEROK 110® PROTECTIVE COATINGS

•• barriers between your plant and corrosion

Coatings are as valuable and important as the equipment or structure they protect. Obviously, no one material can resist every type of corrosive fume and splash; and some are better able to withstand abrasion. You must choose a specific type of coating for its effectiveness in protecting against both physical and chemical conditions encountered in your plant.

In the selection of coatings, ATLAS Technical Service can be particularly helpful. This service is based on over thirty years of experience with corrosion-proof products. In addition to manufacturing a complete line of protective coatings, ATLAS produces a broad line of corrosion-proof cements, vessel linings and unplasticized rigid polyvinyl chloride fabrications.

WRITE for ATLAS BULLETIN 7-2 containing complete information for the proper selection and use of ATLAS PROTECTIVE COATINGS.

ATLAS . . . corrosion-proof cements . . . coatings . . . vessel linings . . . plastic structures.

ATLAS MINERAL PRODUCTS CO.
MERTZTOWN, PENNSYLVANIA

Engineering representatives throughout the United States

When inquiring check CP 4060 on handy form, pgs. 2-3

CORROSION CONTROL

Aluminum paint like new after 2½ yrs on diesel exhaust stacks . . .

withstands heat up to 1100°F

Aluminum-pigment coated diesel exhaust stacks at San Patricio reduction plant, Corpus Christi, Texas, look almost as good as day paint was applied — two and one-half years ago. Despite fact that normal operating temperture of stacks is about 960°F (sometimes as high as 1100°F), stacks have not been touched, and condition of paint is good.

Sandblasting prior to painting proved to be most successful cleaning method. After application of primer coat, diesel engines were started immediately, and run for 24 hours. Engines were then shut down, aluminum-silicone paint applied and engines started again, bringing stacks up to full temperature.

Officials state that many companies in same area consider 90-day life on similar paint job to be excellent.

(Paint application method was developed by Reynolds Metals Company, Dept. CP, 2500 S. Third Street, Louisville, Ky. Check CP 4061 on handy form, pages 2 and 3.)

Non-corroding pipe is made of 100% polyethylene

Uses: Conveying industrial chemicals and gases, sewage and wastes.

Features: Pipe is made of 100% virgin polyethylene resin and is non-toxic.

Description: Lightweight, flexible plastic pipe, designated Series 200, will not rot, rust, or corrode. It is easily handled and requires no special tools to install.

(Plastic pipe is product of Quaker Rubber Corp., a Div. of H. K. Porter Co., Inc., Dept. CP, Tacony and Comly Sts., Philadelphia 24, Pa. . . . or check CP 4062 on handy form, pages 2 and 3.)

VALUE!

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"Metalsmiths" Stainless Steel and Monel Utensils

Prompt shipment —anywhere!

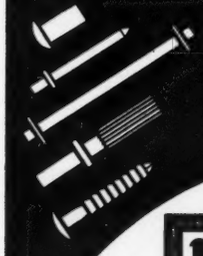
We've shipped "Metalsmith's" corrosion-resistant utensils all over the world for more than 30 years, with utmost satisfaction. Highest quality materials and workmanship assure long wear. All items shown, plus beakers, stock pots, batch cans and shovels, in stock. Buy, try, compare!

WRITE FOR LATEST CATALOG — PRICE LIST

METALSMITHS
Division of **Orange Roller Bearing Co., Inc.**
556 White Street Orange, N. J.

When inquiring check CP 4063 on handy form, pgs. 2-3

CORROSION RESISTANT



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Hassall fasteners are cold headed for maximum strength, lowest cost.

Special fasteners of all types, in any metal are a HASSALL specialty. Small as well as large quantities economically produced. The use of special cold forged parts may cut your parts cost and reduce your assembly cost.

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JOHN HASSALL, INC. P.O. Box 2196 Westbury, Long Island, New York

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SUBMERGED
Oilless
BEARINGS
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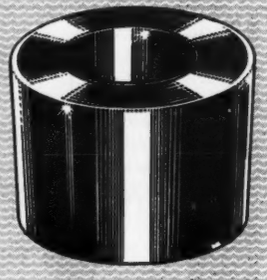
GRAPHALLOY



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- EXTREMELY DURABLE
- CONSTANT COEFFICIENT OF FRICTION
- APPLICABLE OVER A WIDE TEMPERATURE RANGE — even where oil solidifies or carbonizes
- EXTENSIVELY USED IN CONVEYORS, PUMPS AND OVENS
- ROTATING SEALS OF GRAPHALLOY ARE UNEXCELLED

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1004 NEPPERHAN AVE. • Yonkers, New York
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SUBMERGED OILLESS BEARINGS.

NAME & TITLE
COMPANY
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CITY ZONE STATE

When inquiring check CP 4065 on handy form, pgs. 2-3

CORROSION KEYS

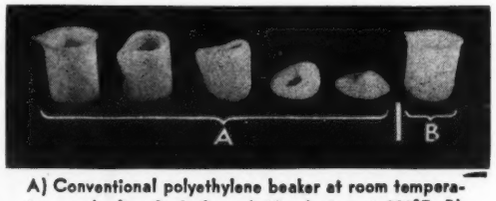
Starting on page 88 is a set of Corrosion Keys. These show corrosion properties of materials of construction at a glance.

Keys presented here deal with common alloys and plastic material . . . *more are coming in future issues* of CHEMICAL PROCESSING.

More uses seen for polyethylene that has been "bombarded" by high energy particles

Uses: Potential applications include use in evaporators and other vessels used for boiling solutions, equipment that must be frequently sterilized for cleanliness and sanitation, and in laboratory ware. In particular, expanded applications are seen for those industries already utilizing advantages of polyethylene, but whose further application has been limited because of its low resistance to higher temperatures.

Features: Molecular structure and such properties as heat resistance and tensile strength of polyethylene have been altered by subjecting it to bombardment of high energy particles. Material resulting will withstand temperatures up to 350°F.



A) Conventional polyethylene beaker at room temperature and after 3, 6, 8, and 10 minutes at 300°F. B) Irradiated polyethylene beaker after 1 hr at 300°F

Description: Plastic material, called Agilene-HT, retains desirable properties of polyethylene such as toughness, flexibility, impact resistance, and complete inertness in most chemical environments. In addition, excellent dielectric properties of polyethylene can be utilized at higher temperatures. Mechanical properties of the irradiated plastic are improved, and improvements are retained at higher temperatures.

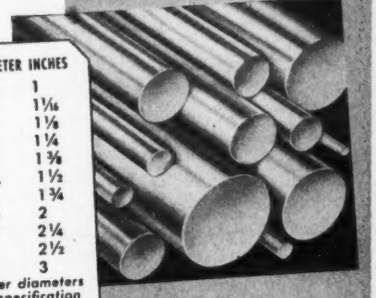
(High-temp polyethylene is a product of The American Agile Corp., Dept. CP, 5461 Dunham Rd., Maple Heights, Ohio . . . or for more information check CP 4066, pages 2 and 3.)

Teflon*... SHEET ROD TUBING

Your Best Source Is JOHN CRANE

Thickness Inches	Nominal Size
1/16	12 x 12
3/32	18 x 18
1/8	24 x 24
3/16	36 x 36*
1/4	48 x 48*
3/8	
1/2 & Up	

* Can be furnished in 1/2 sheets

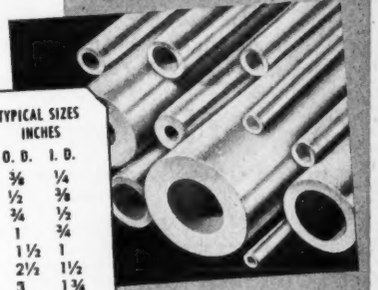


DIAMETER INCHES	
1/4	1
5/16	1 1/16
3/8	1 1/8
7/16	1 1/4
1/2	1 3/8
9/16	1 1/2
5/8	1 3/4
3/4	2
7/8	2 1/4
	2 1/2
	3

Other diameters on specification

HERE'S WHY: You can order in quantity and in a wide variety of sizes—and be certain of complete uniformity throughout. Our strict density control assures you thoroughly non-porous Teflon—free from any flaws which might possibly affect your end use or product. Dimensions are accurate to your most critical tolerances—no rejects, waste of material or loss of time. You get product purity—Teflon at its best in every one of its remarkable characteristics. Delivery is prompt—you get the quantity you want when you want it.

Since the availability of Teflon, "John Crane" engineers have worked with Industry to successfully solve innumerable problems and develop new applications. *You can benefit from their experience and know-how.*



TYPICAL SIZES INCHES	
O. D.	I. D.
3/8	1/4
1/2	3/8
3/4	1/2
1	3/4
1 1/2	1
2 1/2	1 1/2
3	1 3/4

Characteristics of Teflon

CHEMICAL
Completely inert.
ELECTRICAL
Very high dielectric strength. Extremely low power factor.
THERMAL
Temperature range −300° to +500° F.
MECHANICAL
Strong, flexible, weather resistant.
LOW COEFFICIENT OF FRICTION
Absolutely non-stick.

* DuPont Trademark

Request full information and ask for our bulletin, **"The Best in Teflon."** *Crane Packing Co., 1821 Cuyler Ave., Chicago 13, Ill.*
In Canada: Crane Packing Co., Ltd., 617 Parkdale Avenue, N., Hamilton, Ont.

JOHN CRANE CRANE PACKING COMPANY

When inquiring check CP 4067 on handy form, pgs. 2-3

MIXED ACID CORROSION

These charts on corrosion by mixed acids and recommended materials of construction are taken from "Corrosion Data Survey", a new book based on research at Shell Development Corp.

Corrosion Data Survey

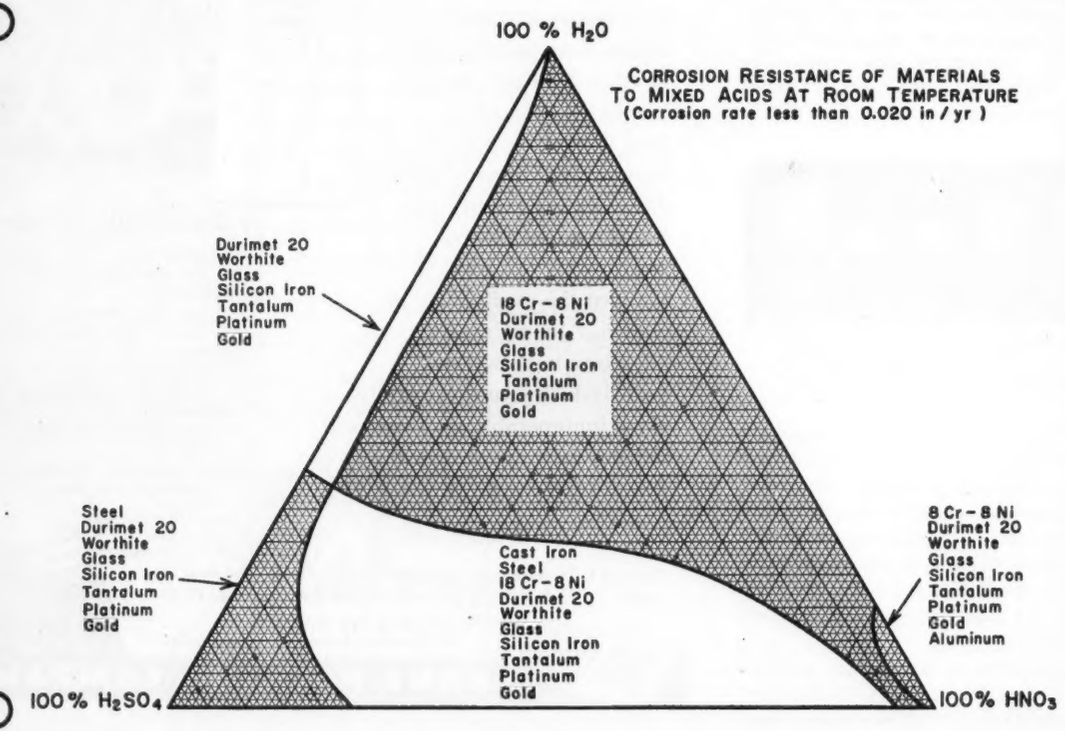
Reviewed by Dr. LEONARD R. SCRIBNER

Crane Company, Engineering Division
Formerly Chief Engineer, Chemical Div.
Fansteel Metallurgical Corporation

"Corrosion Data Survey" states its purpose in the first two paragraphs of its preface and proceeds, in a most orderly fashion, to accomplish it. Not intended as a treatise on corrosion cause and effect, it does not theorize. It does a thorough, excellent job of recording data on resistance of construction materials to about one thousand common corrosives, however.

Special attention is given steel with sulfuric, and mixed acids; other materials with sulfuric, hydrochloric, and mixed acids. Importance attached to these basic materials is certainly in order. Likewise, graphs showing operating limits of steels with high temperature hydrogen and other metals with high pressure carbon monoxide with hydrogen will interest engineers in many industries.

(*Continued on page* 86)



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small gate valves?

need small 600 lb. gate valves?
only PACIFIC can offer this selection!

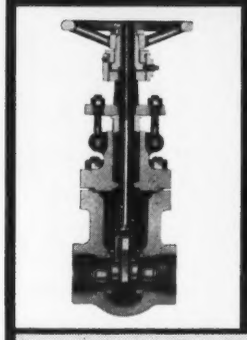

fig. no. 3651
o. s. & y., bolted bonnet gate valve. a premium valve available in a wide choice of trim materials and recommended where a full port opening is required.

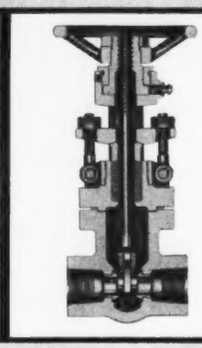

fig. no. 595
o. s. & y., bolted bonnet gate valve. comparable to fig. no. 3651 but somewhat more economical and its use is suggested where a full port opening is not essential.

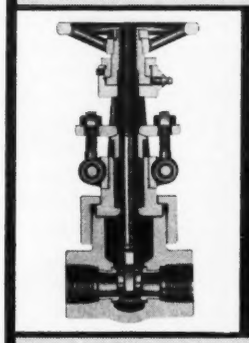

fig. no. 55
o. s. & y., union bonnet gate valve. an economical valve for those that prefer the compactness and dismantling features of the union bonnet construction.

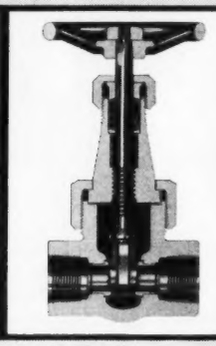

fig. no. 65
inside screw, union bonnet gate. a low cost compact valve for use where space and weight are important and where a full port opening is not required.

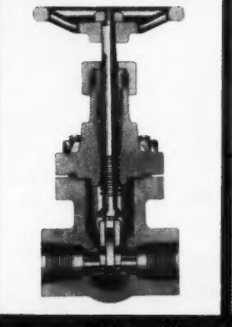

fig. no. 695
inside screw, bolted bonnet gate. the "competitor" to meet the tightest cost budget, yet offering the bolted-on bonnet feature. comparable to fig. no. 65.

write or phone today for additional information on these valves and on PACIFIC's entire line of corrosion resistant valves.

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When inquiring check CP 4068 on handy form, pgs. 2-3

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Fatty Acids
and Methyl Esters

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El Dorado has specialized in coconut oil products for more than half a century. That's one big reason you can depend on the performance of El Dorado products in your formulations. You'll find that El Dorado's standards are the highest in the industry.

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When inquiring check CP 4069 on handy form, pgs. 2-3

Many chemicals handled by PVC pipe, fittings

Rigid, unplasticized polyvinyl chloride pipe and fittings which exhibit excellent resistance to attack by a broad group of chemicals are described in four-page bulletin. Mechanical, electrical, thermal, and miscellaneous properties of pipe and fittings are listed.

Bulletin on Van-Cor 1 is available from The Colonial Plastics Mfg. Co., Dept. CP, 8007 Grand Ave., Cleveland 4, Ohio. When inquiring specify CP 4070 on the convenient Reader Service slip located between pages 2 and 3.

Concrete surfacing material is impervious to solutions containing HF . . .

product is also resistant to other chemicals

Uses: For protection of floors, trenches, tank bases, and other concrete structures in process areas. Material can be used to line waste disposal tanks or for acid holding tanks and neutralizing tanks. In certain applications, coating has replaced brick on the vertical walls of pits used in pickling operations.

Features: Surfacing material is resistant to hydrofluoric acid solutions, as well as a wide variety of other corrosives.

Description: Ceilcrete is a mixture of inert fillers and pigments with a 100% synthetic resin binder. When applied to concrete at a minimum thickness of 1/8", coating provides a monolithic membrane that is impervious to corrosives.

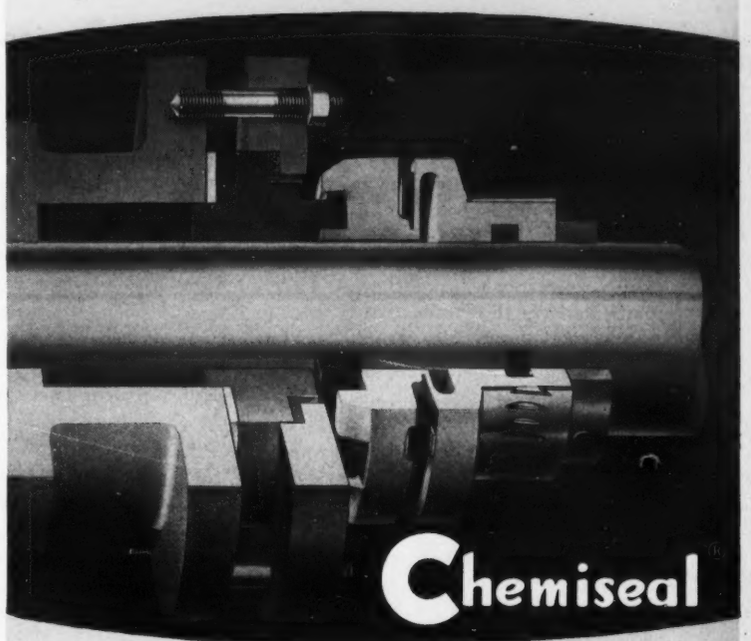
(Ceilcrete is a product of The Ceilcote Company, Dept. CP, 4832 Ridge Road, Cleveland 9, Ohio . . . or for more information reader may simply check 4071 on the convenient Reader Service slip located between pages 2 and 3.)

Shows uses of clay pipe for corrosives

Special applications of clay pipe, which is unaffected by acids, gases, and common industrial chemicals, are shown in four-page bulletin. Plastic pipe joints, consisting of phenolic collars and threads of plastisol, are also described.

Bulletin on Screw-Seal clay pipe is issued by Vitrified Products Div., The Robinson Clay Product Co., Dept. CP, 65 W. State St., Akron 9, Ohio. When inquiring reader may simply specify CP 4072 on the convenient Reader Service slip which is located between pages 2 and 3.

Here is the Shaft SEAL you have been wishing for



Chemically Impervious TEFLON Balanced Bellows Design

Three years of actual field tests have proven that Chemiseal external mechanical seals last longer and give unsurpassed performance under a wide variety of chemical service conditions—handling acids, alcohols, alkalies, hydrocarbons, and related chemical compounds including abrasive slurries and tarry material (with provisions for flushing).

Combining the Bellows design, which provides pressure balance so essential for long leak free service, with duPont TEFLON the wonder plastic for immunity to corrosion and contamination—United States Gasket engineers have produced a mechanical seal which makes "sealing" simple and economical for the process industries.

FEATURES

• CHEMICALLY IMPERVIOUS TEFLON Bellows section. A selection of seal face materials dependent upon medium and service requirements.

• SEAL ROTATES WITH SHAFT Only bearing surface is between precision ground rotating and stationary seal faces Low friction load on shaft. Lower power cost. Drop tight service.

• NO SCORING OF SHAFTS and Chemiseals work satisfactorily on shafts previously scored by other seals or packing.

• LIFE EXPECTANCY many times that of other seals or packing.

• PRESSURES at the seal up to 100 psi at 75°C or 75 psi at 100°C.

• SIZES from 3/8" to 2 1/4". Other sizes for special applications.

• MAXIMUM LENGTH, all seals 2 1/4".

Write for Bulletin No. MS-954.

UNITED STATES GASKET COMPANY
CAMDEN 1 • NEW JERSEY
FABRICATORS OF duPont TEFLON
Kellogg KEL-F AND OTHER PLASTICS
Representatives in Principal Cities Throughout the World

When inquiring check CP 4073 on handy form, pgs. 2-3

Mixed Acid Corrosion

(*Continued from page* 84)

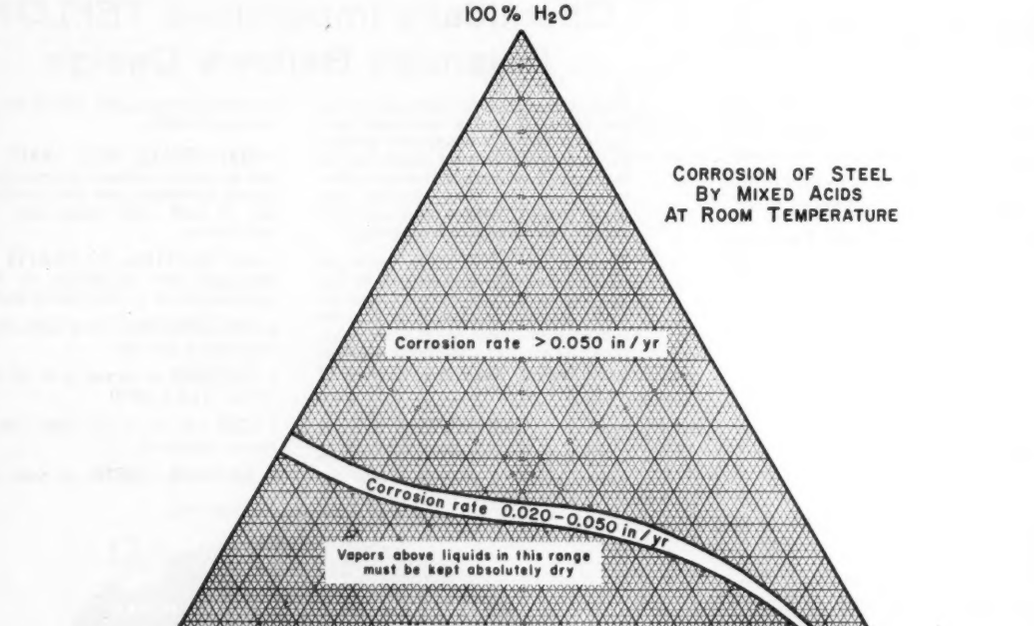
Concise graphic presentation is echoed by the accompanying text — which is almost surprisingly brief. Seventeen page discussion which concludes this book is helpful. It dispels illusions of dogmatic acceptance which printed data may create, particularly in the minds of the inexperienced.

Graphs are simple and easy-to-follow. Mechanical errors are few. Selection of four ratings for corrosion is questionable, but such ratings are arbitrary by definition. Those chosen are as good as any that could have been chosen. Likewise, points on the graphs may be questioned as matters of opinion, but, obviously, facts were carefully weighed and much thought was given to the data.

There are gaps in information presented — as in any book on this subject. Gathering statistical information in itself is not generally thought to be worthy of a thesis for a doctorate, but more corrosion data is definitely needed, and collection of such data is certainly in order as a senior project. Chemical producers might publish information about materials of construction which can (and cannot) be used with their products. Suppliers of these materials, too, might rightfully be expected to furnish more data.

This survey will be used casually by those concerned with corrosion only philosophically. It will be used by researchers and pilot plant operators looking for better materials. It will be used by chemical engineers seeking better, more durable equipment. Maintenance supervisors and engineers will use it, and buyers and purchasing engineers will want access to it occasionally.

To obtain "Corrosion Data Survey" edited by G. A. Nelson, remit $35 direct to Shell Development Corp., Dept. CP, Emeryville, Calif. . . . or for more information check CP 4074 on handy form, pages 2 and 3.



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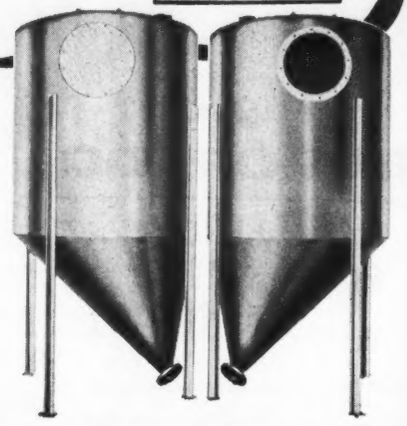
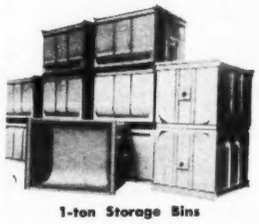
For long, satisfying service—
Chemical Processing Equipment
Fabricated by *Glasco*

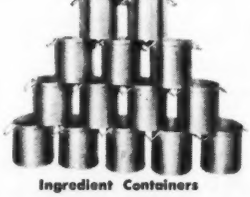


Double Conical Hopper Tanks

Glasco has grown big by exceptional custom fabricating service to many of the country's leading chemical processors.



1-ton Storage Bins



Ingredient Containers

- The GLASCO plant is one of the best equipped on the eastern seaboard.
- GLASCO'S staff includes highly qualified technical men and craftsmen.
- GLASCO's stocks of steel, stainless steel, aluminum, and other non-corrosive metals are kept always high.
- GLASCO is qualified to custom-fabricate, of metal, practically anything your process requires.
- Deliveries are strictly according to customers' requirements.

You are invited to visit our plant — to consult with our experts — and to find out why Glasco can render exceptional service to you.

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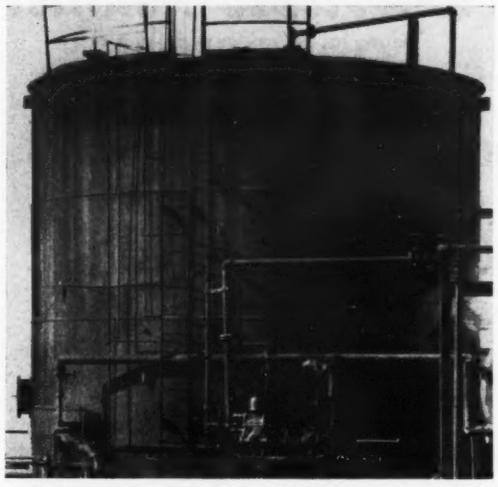
Pioneer Fabricators of Stainless Steel Equipment
10 WAIT STREET — GLASCO PRODUCTS — PATERSON 4, N. J.

Phila. Area: Marple Organization, 1200 Commercial Trust Bldg., Philadelphia 2, Pa.
New York State: Sanders Industrial Equip. Co., 1351 Broadway, Albany 4, N. Y.
South: Henry H. Harsey Co., 44 Norwood Place, Greenville, So. Car.
New England: Harris & Underhill, 440 Statler Bldg., Boston, Mass.

When inquiring check CP 4075 on handy form, pgs. 2-3

Coating applied over 12 years ago — tank hasn't required any corrosion preventive maintenance since

Problem: Corrosive mist and fumes (containing sulfuric acid) emanating from steel mill's coke quenching station were attacking coatings on nearby steel storage tanks to such an extent that repainting was necessary at least once a year to pre-



Bituminous-base coated tank withstands corrosive mist and fumes from coke quenching station

vent damage to tanks. Time and material spent in the operation was considerable.

Solution: For evaluation purposes, one of the tanks was covered with a bituminous-base coating called Insul-Mastic (type D). Highly inert, its chief fillers are mica flake, asbestos fiber, and

Conventional coated tank — located less than 20 ft from mastic coated tank, requires repainting yearly

ceramic clay. Granulated cork is added for insulation purposes. Coating is applied 1/4 to 3/8 inches thick can be used within range of −40 to 250°F.

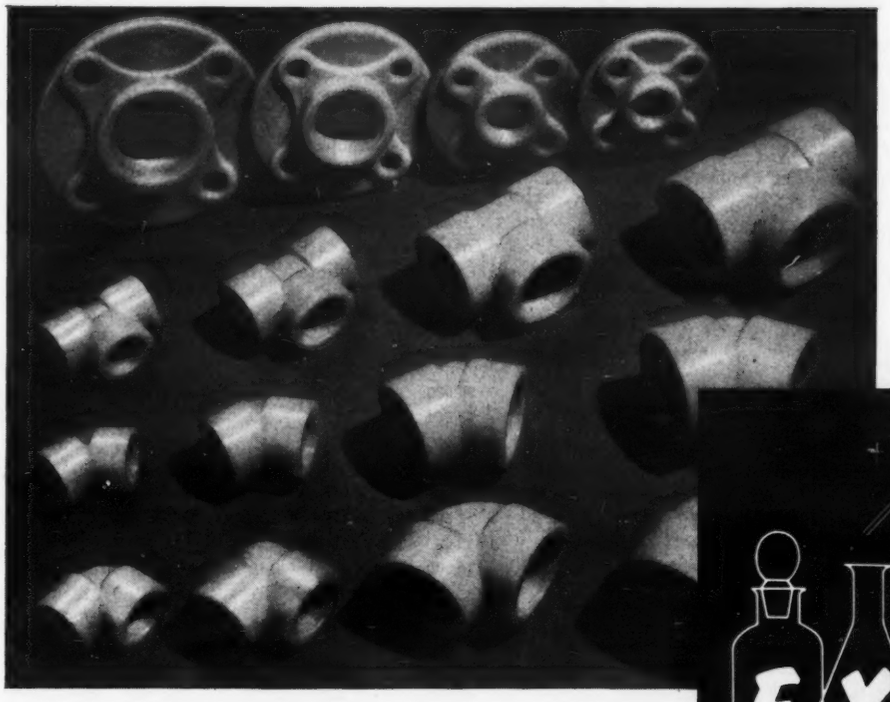
Results: No corrosion-preventive maintenance has been necessary on tank since coating was applied — which was over 12 years ago. Not only does it prevent corrosion and control condensation, but it is reported to prevent about 65% heat loss.

(Insul-Mastic coating is product of Insul-Mastic Corp. of America, Dept. CP, Oliver Bldg., Pittsburgh 22, Pa. Check CP 4076, pages 2 and 3.)

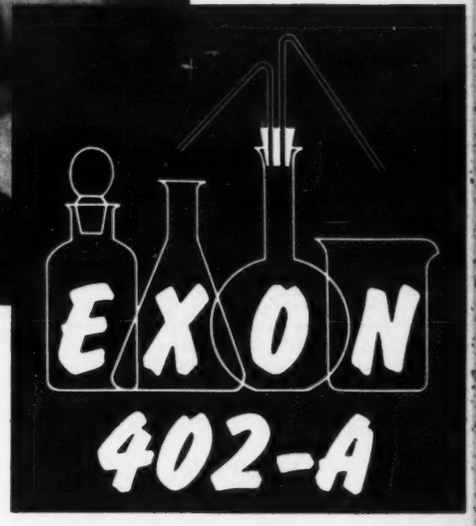
unplasticized P.V.C. now can be

MOLDED

for unlimited low-cost, corrosion-resistant applications



—using **Firestone**



***Exon 402-A* truly is a most versatile resin!**

It makes possible molded unplasticized P.V.C.—opens wide new horizons for many low-cost, high-strength, corrosion-resistant applications —in an infinite variety of sizes and shapes.

It's no great news that unplasticized P.V.C. pipe has long been available. But it is exciting news that you can now use Exon 402-A to quickly turn out pipe fittings of Standard I.P.S. sizes ½" through 4", slip-fit or threaded. The products shown here are absolutely uniform . . . with excellent chemical resistance and inertness. Imagine the limitless possibilities this material offers in the pipe field alone!

Exon 402-A used to mold products made of unplasticized P.V.C. could easily end *your* search to cut costs in processing tough, corrosion-resistant products. For complete details on the many advantages, uses and applications of Exon 402-A, contact Firestone today.

for complete information on the entire line of Firestone ***EXON*** resins, call or write:

CHEMICAL SALES DIVISION
Firestone Plastics Company
Dept. 8H
Pottstown, Pa.
Division of The Firestone Tire & Rubber Co.

When inquiring check CP 4077 on handy form, pgs. 2-3

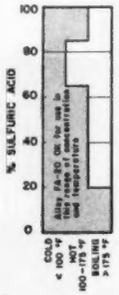
CORROSION KEYS: Alloys

Data by N. S. MOTT
Chief Chemist and Metallurgist, Cooper Alloy Corporation
"Keys" by BRUCE FADER, Associate Editor

PART I

Despite great amounts of data dealing with corrosion, only vague limits are often presented. Lack of mechanical data reduces usefulness of this data. Following table of mechanical properties and "Keys" form a quick and handy method for finding preliminary answers to specific problems.

Keys are mainly based on a relatively low rate of corrosion — 0.020 inches per year. Even in the more violent corrosive conditions covered, rate in the acceptable range does not exceed 0.040 inches. In these keys **Cold** refers to temperatures below 100°F; **Hot** to the 100-175°F range; **Boiling** to temperatures above 175°F and up to and including boiling. Note that chemicals are arranged in groups of similar materials, where possible.

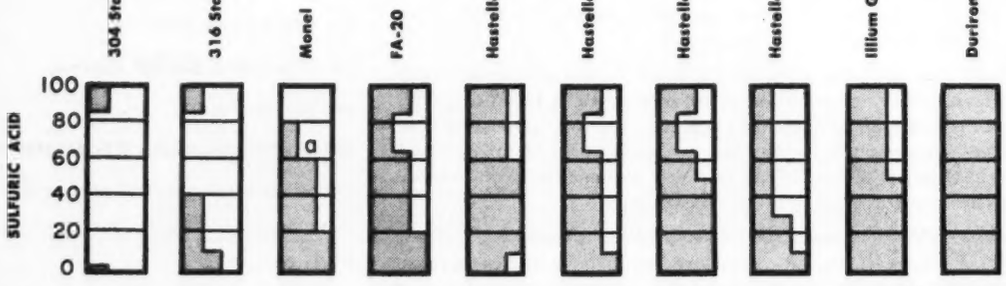


Enlarged Key shows how FA-20 alloy reacts to sulfuric acid. It resists attack from any concentration of acid when temperature is below 100°F. Between 100 and 175°F it is resistant to all concentrations except the range from 65 to 85%. For temps above 175°F, maximum allowable concentration is 20% acid

MECHANICAL PROPERTIES OF ALLOYS

Alloy	Tensile Strength psi	Yield Point psi	Elongation %	Reduction in Area %	Hardness BHN
304 wrought	85,000	35,000	60	70	150
304 cast	78,000	38,000	55	63	140
316 wrought	80,000	30,000	60	70	150
316 cast	80,000	42,000	50	55	160
Monel wrought	90,000	60,000	35	....	160
Monel cast	72,500	36,000	33	....	140
FA-20 wrought	85,000	35,000	50	65	160
FA-20 cast	70,000	30,000	45	50	140
Hastelloy B wrought	135,000	62,500	43	....	225
Hastelloy B cast	78,500	56,000	8	....	210
Hastelloy C wrought	121,500	60,000	40	....	200
Hastelloy C cast	76,000	46,500	13	....	200
Hastelloy D cast	40,000	40,000	0	0	475
Hastelloy F wrought	112,000	50,000	43	51	170
Illium G cast	65,000	55,000	6	....	185
Duriron cast	16,000	16,000	0	0	520
Durichlor cast	16,000	16,000	0	0	520

(Continued on page 90)



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CUT HERE AND FILE

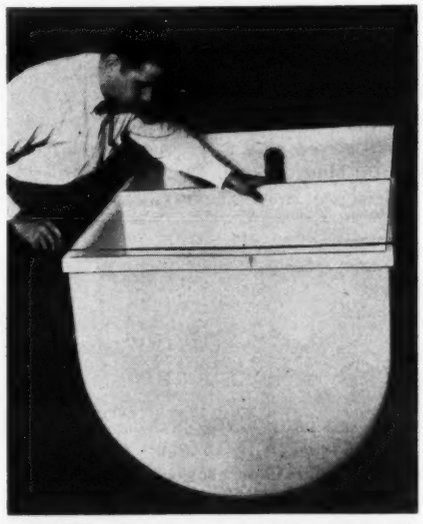
AGILENE (POLYETHYLENE)
AGILIDE (NON-PLASTICIZED) (POLYVINYL CHLORIDE)

"Barriers AGAINST CORROSION"

PLASTIC FABRICATIONS FOR THE CHEMICAL HANDLING INDUSTRIES

MODERN MATERIALS OF CONSTRUCTION

Agile's high-grade modern thermoplastic construction materials — AGILENE and AGILIDE—fabricated by a unique combination of forming and welding processes in which we specialize, are your safeguard for an economical and properly engineered installation.



AGILENE catch tanks, with baffle and overflow, fabricated from ½" sheet, of welded and formed construction. These vessels are used in manufacture of explosives where chemical resistance and physical ruggedness are prime factors—typical of Agile fabrications to meet exact processing requirements, minimizing maintenance costs.

American Agile Corporation
Plant and General Offices • 5461 Dunham Rd., Maple Heights, Ohio
Mailing Address: P. O. Box 168 • Bradford, Ohio
DEPT CP-1

When inquiring check CP 4078 on handy form, pgs. 2-3

Protects underground gas pipe from corrosion . . .

plastic tape is resistant to galvanic, water, and chemical attack

Recently completed installation of an underground natural gas pipeline is being protected from galvanic, water, and chemical corrosion by plastic tape. The tough polyethylene adhesive film also resists bacterial and fungus growth and has high dielectric strength.

Tape (black roll) is applied cold by machine

In this particular installation in Georgia, over 80 miles of tape were used — most of it machine applied. This method of application increases the economic utility of tape as a pipeline protector. Machine used cleans pipe, wraps and presses tape into place, and over-wraps with tar-saturated asbestos felt at speeds to 30,000 feet a day. No heat, liquids, solvents or thinners are required to apply tape.

(Plastic tape is a product of Polyken Products Dept., The Kendall Co., Dept. CP, 222 W. Adams St., Chicago 6, Ill. . . . or for more information reader may simply check CP 4079 on handy form, pages 2 and 3.)

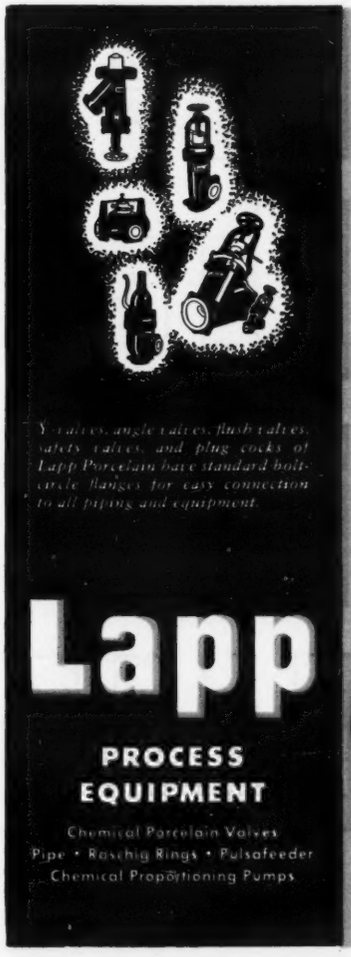
Titanium uses discussed

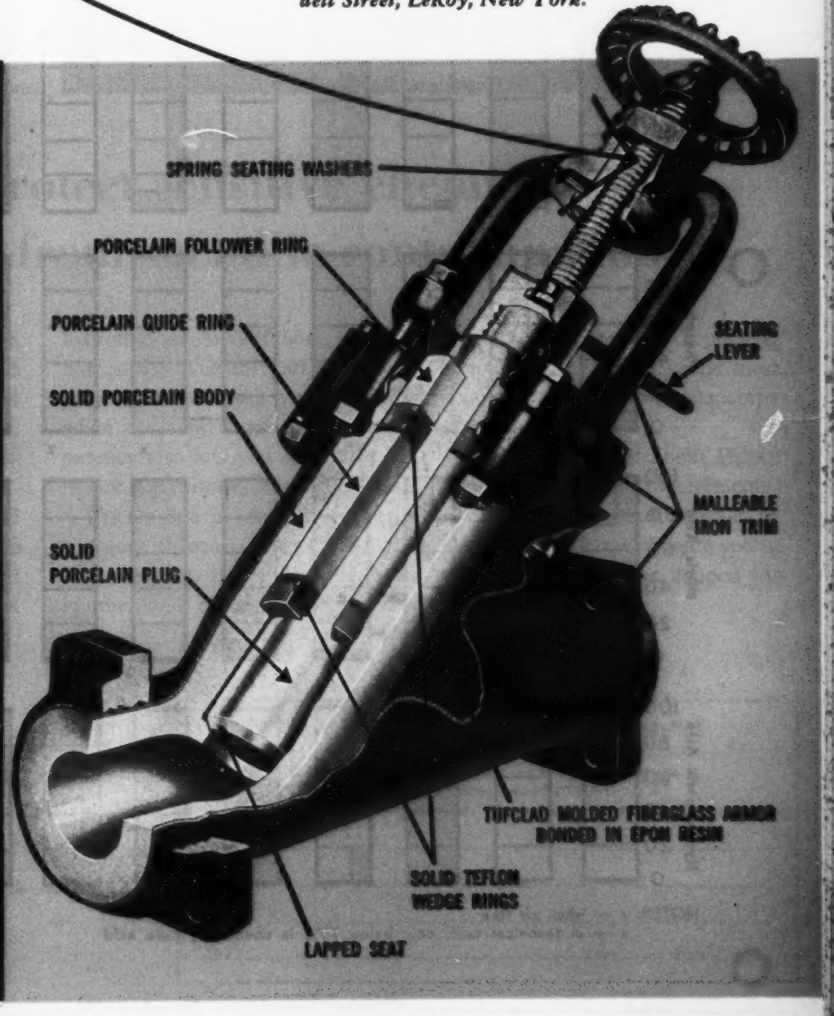
The particular properties of titanium, including its corrosion resistance, and their advantageous utilization in the process and other industries are discussed in 16-page brochure. Availability of the metal and characteristics of titanium alloys are included. Tips on grinding, working, heat treating, and forming titanium are also offered.

"Now You Can Use Titanium" is available from Rem-Cru Titanium, Inc., Dept. CP, Midland, Pa. When inquiring check CP 4080 on handy form, pages 2 and 3.

Easy working and long life in chemical atmospheres . . . for the Lapp Valve

Non-ferrous working parts in the Lapp Valve eliminate freeze-ups from scales of corrosion. Threaded stud, yoke bushing and nuts, and plug cap are all brass or bronze, which keep the valve smoothly operative in all but the most unusual conditions of chemical atmosphere. Flange, yoke and gland are of high strength malleable or ductile iron, and are protected with baked-on Epon-base acid-proof paint. Flanges are permanently bonded to porcelain or armor with acid-proof resin cement. ***Write for bulletin with complete description, characteristics, and specifications. Lapp Insulator Co., Inc., Process Equipment Division, 324 Wendell Street, LeRoy, New York.***


Y-valves, angle valves, flush valves, safety valves, and plug cocks of Lapp Porcelain have standard bolt-circle flanges for easy connection to all piping and equipment.
Lapp
PROCESS EQUIPMENT
Chemical Porcelain Valves
Pipe • Raschig Rings • Pulsafeeder
Chemical Proportioning Pumps

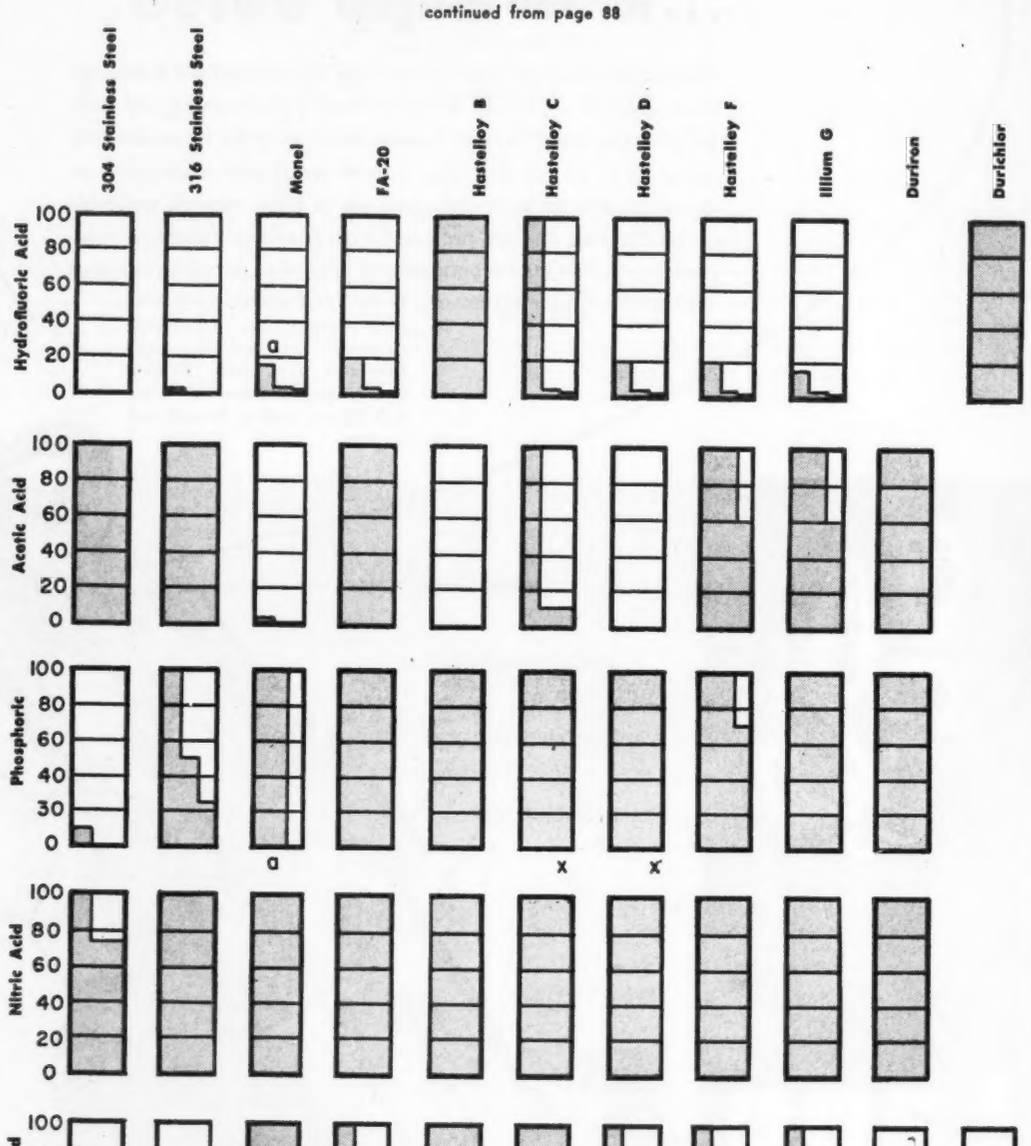


When inquiring check CP 4081 on handy form, pgs. 2-3

CORROSION KEYS: Alloys

104b

continued from page 88



NOTES: a — when air free
x — in technical acid, only below 70% in chemically pure acid

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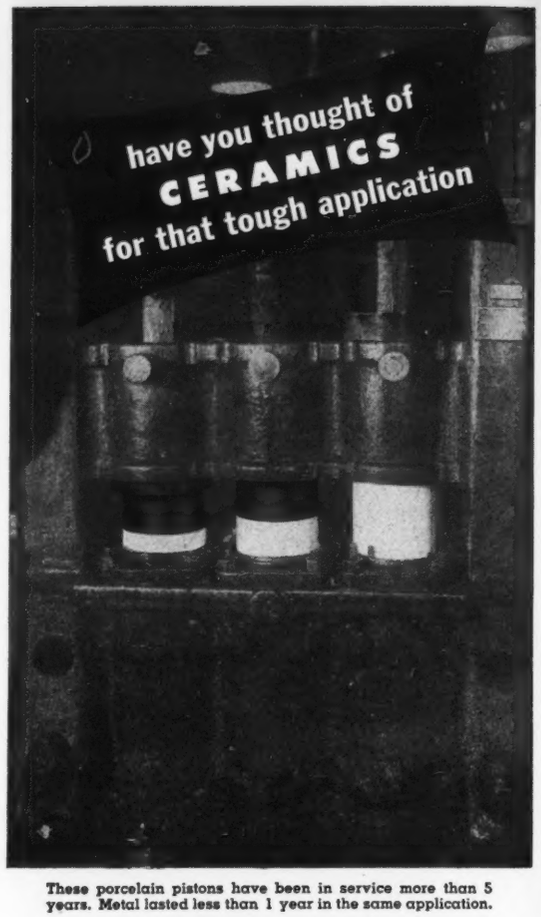


These porcelain pistons have been in service more than 5 years. Metal lasted less than 1 year in the same application.

MUCH TOUGHER THAN STEEL— AND TOLERANCES .0005" OR CLOSER

●If metal has failed to stand up under erosion, corrosion, friction or high temperature — try porcelain. Parts made of a high strength ceramic (porcelain) surpass all records for long service life, such as the pump pistons shown here. Nothing can match ceramics in the proper application. Ceramics can be shaped to any design and tolerances held to .0005" or closer.

McDanel specializes in special ceramic parts — special shape, special mix, special body, special die. Most manufacturers steer away from specials but McDanel specializes in specials.

Just sketch your idea and send it along. Your inquiry will be special to McDanel.

McDANEL Industrial PORCELAINS
McDANEL REFRACTORY PORCELAIN COMPANY
BEAVER FALLS, PENNA.

When inquiring check CP 4082 on handy form, pgs. 2-3

Alkalis and acids resisted by general maintenance coating . . .

material can be brushed or sprayed on wherever surfaces need protection

Uses: General maintenance applications for machinery, equipment, and floors where coating used must withstand corrosive liquids, fumes, or repeated washings with cleaners or solvents.

Features: Coating material shows a high degree of resistance to alkalis and weaker acids. Where stronger acids are encountered a concentrated coating, Chemical and Solvent Resisting, is available. Material withstands attack of solvents, fats and greases. It is also resistant to abrasion and to penetration by water vapor.

Description: All-purpose coating, called Speed Rex, is made in several concentrations of Devran epoxy resin. It may be brushed or sprayed on any surface. After application, material dries fast. Adhesion to metal, concrete, or wood is good; one coat covers.

Coating is designed to withstand temperatures up to 300°F in constant exposure, 350°F for short periods.

(Chemical-resisting coating is a product of Truscon Laboratories, a div. of Devoe & Raynolds Co., Inc., Dept. CP, PO Box 69, Milwaukee Jct. P.O., Detroit 11, Mich. Check CP 4083, pages 2 and 3.)

Compressive strength of 10,000 psi provided by cement that joins brick or tile

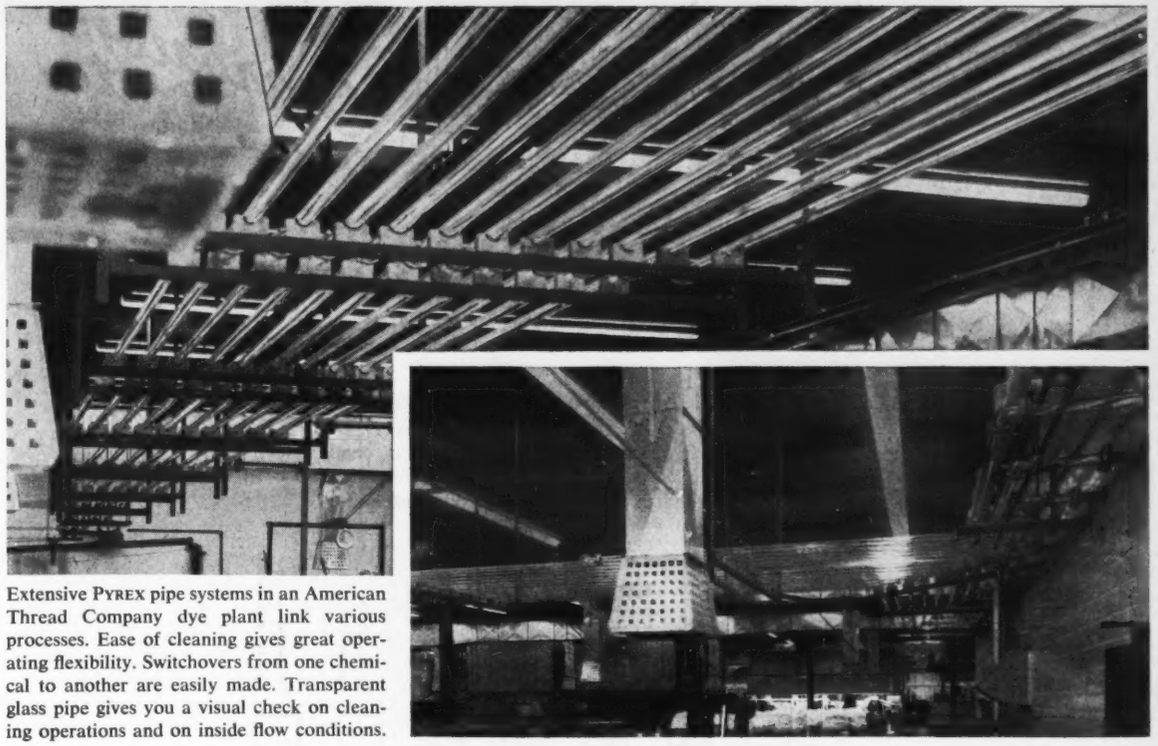
Uses: Joining brick and tile in floors and tanks.

Features: Material makes use of an alkaline catalyst and sets hard in contact with concrete or metals. It is resistant to non-oxidizing acids such as hydrochloric, phosphoric, and dilute sulfuric acid, most corrosive salts, alkalis in all concentrations, and most solvents.

Because the material is readily converted from a workable mortar to a hard electrically conductive solid, it shows promise as a plastic cement. It is also available in a non-conductive formulation for use in embedding electrodes in electrolytic process equipment.

Description: Corrosion-resistant cement, called Alfane, is based on a filled liquid epoxy resin. When thoroughly set, the cement has a tensile strength greater than 1000 psi and a compressive strength over 10,000 psi. It is satisfactory for continuous exposures to temperatures up to 200°F.

(Corrosion-resistant cement is a product of The Atlas Mineral Products Co., Dept. CP, 26 Walnut St., Mertztown, Pa. Check CP 4084, pages 2 and 3.)



Extensive PYREX pipe systems in an American Thread Company dye plant link various processes. Ease of cleaning gives great operating flexibility. Switchovers from one chemical to another are easily made. Transparent glass pipe gives you a visual check on cleaning operations and on inside flow conditions.

How to protect sensitive chemicals from metallic contamination

Your solution to pipeline corrosion and product contamination can be as simple as switching to PYREX brand "Double-Tough" glass pipe.

Fine chemicals and pharmaceuticals are perfectly safe from metallic contamination in glass. And PYREX glass pipe is perfectly safe from the corrosive effects of all acids and acidic solutions (except hydrofluoric). What's more, PYREX pipe is easy to clean. And it's transparent—which means you can see when cleaning is needed. Transparency also lets you spot trouble before it gets out of hand.

PYREX pipe is impressive when it comes to economy, too. Initial cost compares favorably with that of other kinds of corrosion-resistant pipe. Maintenance is negligible. Actually, PYREX pipe is the most economical corrosion-resistant pipe you can use today.

Why not find out about PYREX pipe for your specific requirements? A Corning representative would be glad to call without obliging you in any way. Send in the coupon for more information.

CORNING GLASS WORKS
CORNING, NEW YORK
Corning means research in Glass

CORNING GLASS WORKS, 312 Crystal Street, Corning, N. Y.

Please send me the material checked below:

- ☐ "PYREX brand 'Double-Tough' Glass Pipe and Fittings Catalog" (EA-3)
- ☐ "PYREX brand Glass Pipe in the Process Industries" (EA-1)
- ☐ Installation manual on PYREX brand "Double-Tough" Glass Pipe

Name ..... Title .....

Company .....

Address .....

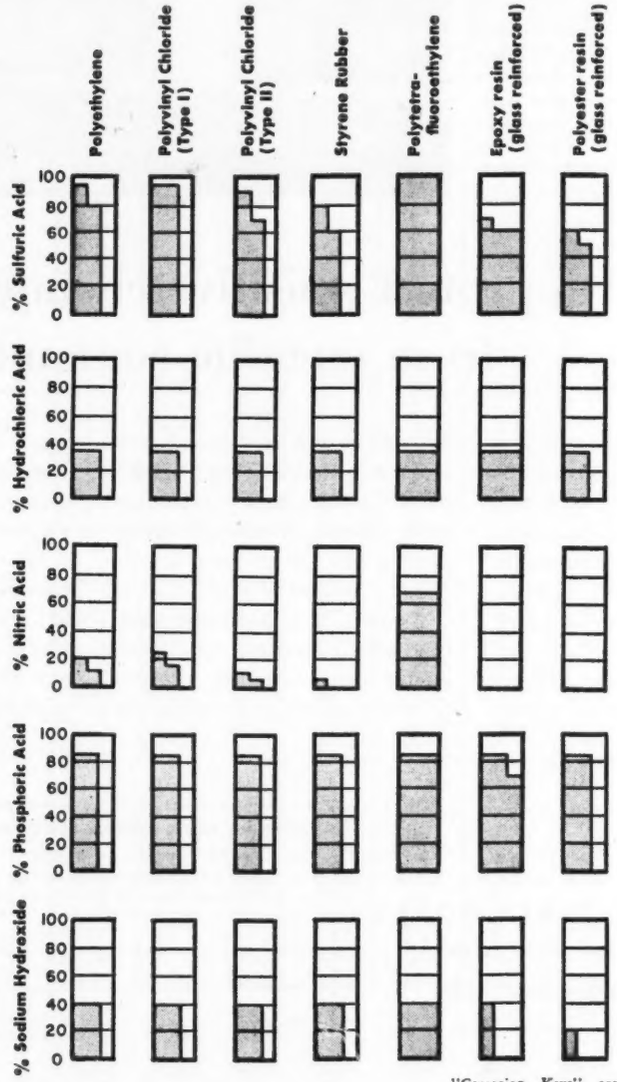
City ..... Zone ..... State .....

When inquiring check CP 4085 on handy form, pgs. 2-3

CORROSION KEYS : Plastics

Data by RAYMOND B. SEYMOUR, President
and ROBERT H. STEINER, Research Director
Atlas Mineral Products Company

Shaded areas of these keys show regions where specific plastic materials should be considered as possible solutions to corrosion problems. Vertical scale of key is concentration of corrosive. Horizontal scale represents temperature: left third, below 100°F; center, 100-150°F; right third, above 150°F to boiling point of liquid



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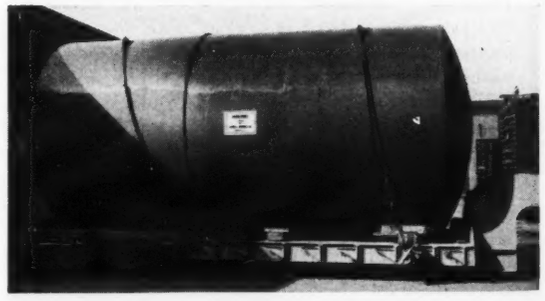
"RUBBERHIDE" Controls
Corrosion and Abrasion
OF METAL PRODUCTS, PARTS AND PLANT EQUIPMENT . . .

Corrosion or abrasion can't get a foothold after "RUBBERHIDE" Linings have been processed to the exterior or interior surfaces of metal objects, regardless of their size, shape or service requirements . . . from thumb screws to 20,000 gallon tanks. Compounded from rubber or neoprene to provide proper resistance to the specific corrosive agents involved, or to combat abrasive wear, these modern Linings invariably repay many times their cost through extended life of the products, parts or equipment to which they have been applied.

"RUBBERHIDE" Linings are processed to objects shipped to our Linings Plants in Trenton, Chicago or Houston; or, when the objects are too large for such shipment, or the work involves fixed plant equipment, experienced field crews do the processing "on location". Whether factory or field processed, you can rely on "RUBBERHIDE" Linings for effective, long-lasting protection.



Write for Booklet, or Contact Our Nearest Branch for Details.

GOODALL RUBBER COMPANY
GENERAL OFFICES, MILLS and EXPORT DIVISION, TRENTON, N. J.
Branches: Philadelphia • New York • Boston • Pittsburgh • Indianapolis • Chicago • Detroit • St. Paul • Los Angeles • San Francisco • Seattle • Spokane • Portland • Salt Lake City • Denver • Houston • Goodall Rubber Company of Canada, Ltd., Toronto • Distributors in Other Principal Cities
Est. 1870

When inquiring check CP 4086 on handy form, pgs. 2-3

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Properties of zirconium show excellent promise for corrosive service

High resistance to heat, excellent corrosion resistance, workability and strength are among the properties of zirconium which should prove of value to the chemical industry in services where equipment is subjected to acid or alkali attack. The following table shows comparative corrosion resistance of zirconium, tantalum, and Type 316 stainless steel (A = Excellent; B = Good; C = Fair; D = Poor):

	Zirconium	Tantalum	Stainless Type 316
Acetic Acid	A	A	B
Aluminum Chloride	A	—	—
Ammonium Hyrox.	A	D	—
Calcium Chloride	A	—	D
Chlorine, water saturated	D	—	—
Citric Acid	A	—	D
Chromic Acid	A	—	C
Ferric Chloride	D	A	D
Formic Acid	A	A	C
Hydrochloric Acid	A	A	D
Lactic Acid	A	—	D
Mercuric Chloride	A	A	D
Nitric Acid			
Dilute	A	A	A
Conc.	A	A	D
Oxalic Acid	A	A	D
Phenol	A	A	B
Potassium Hydrox.	A	C	B
Phosphoric Acid	B	A	D
Sodium Chloride	A	—	B
Sodium Hydroxide			
Sol'n 100°C	A	C	C
Fused 370°C	A	D	D
Sulfuric Acid			
Dilute	A	A	C
Conc.	D	A	D
Tartaric Acid	A	—	—
Carbon Tet.	A	—	B
Hydrogen Peroxide	A	B	—
Ammonium Sulfate	A	—	B

In addition, zirconium has excellent resistance to ethyl alcohol, tannic acid, monochloroacetic acid. It is attacked by hydrofluoric acid, fused potassium nitrate, and aqua regia.

(Information courtesy of zirconium producers, Firth Sterling Inc., Dept. CP, 3113 Forbes St., Pittsburgh 30, Pa. Check CP 4087, pages 2 and 3.)

Graphs indicate resistance of asphaltic mastics

Asphaltic mastic protective coatings are discussed in 12-page bulletin. Four pages of graphs indicate degree of chemical resistance exhibited by asphaltic mastics when immersed in chemical solutions.

"Palladium Mastics for Corrosion Control" is issued by Emjay Maintenance Engineers, Dept. CP, 327 Union Ave., Rutherford, N. J. When inquiring specify CP 4088, pages 2 and 3.

YOU CAN PUMP IN CONTROLLED VOLUME

HYDROCHLORIC ACID... ALL CONCENTRATIONS

CHLORINATED HYDROCARBONS

CORROSIVE METALLIC SALT SOLUTIONS

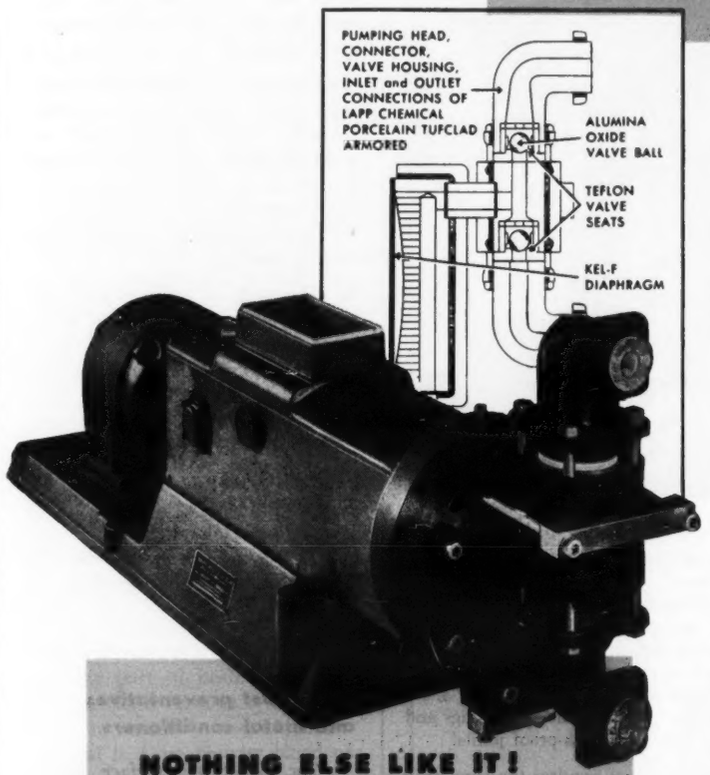
DILUTE ACIDS

MIXED ACIDS

WITH

Lapp PULSAFEEDER

COMPLETELY NON-METALLIC CONSTRUCTION


PUMPING HEAD, CONNECTOR, VALVE HOUSING, INLET and OUTLET CONNECTIONS OF LAPP CHEMICAL PORCELAIN TUFCLAD ARMORED
ALUMINA OXIDE VALVE BALL
TEFLON VALVE SEATS
KEL-F DIAPHRAGM

NOTHING ELSE LIKE IT!

Lapp Pulsafeeder is the combination piston-diaphragm pump for controlled-volume pumping of fluids. Reciprocating piston action provides positive displacement. But the piston pumps only an hydraulic medium, working against a diaphragm. A floating, balanced partition, the diaphragm isolates chemical being pumped from working pump parts —eliminates need for stuffing box or running seal. Pumping speed is constant; variable flow results from variation in piston-stroke length—controlled by manual hand-wheel, or, in Auto-Pneumatic models, by instrument air pressure responding to any instrument-measurable processing variable.

Solid Lapp Chemical Porcelain, combined with parts of alumina ceramic, teflon and Kel-F plastics, is used for the liquid end of this model of Lapp Pulsafeeder. All parts which can come in contact with liquid being pumped are non-metallic, chemically inert. Thus, positive-displacement metered pumping of "hard-to-handle" corrosive chemicals is made certain and permanently trouble-free.

WRITE FOR BULLETIN 440

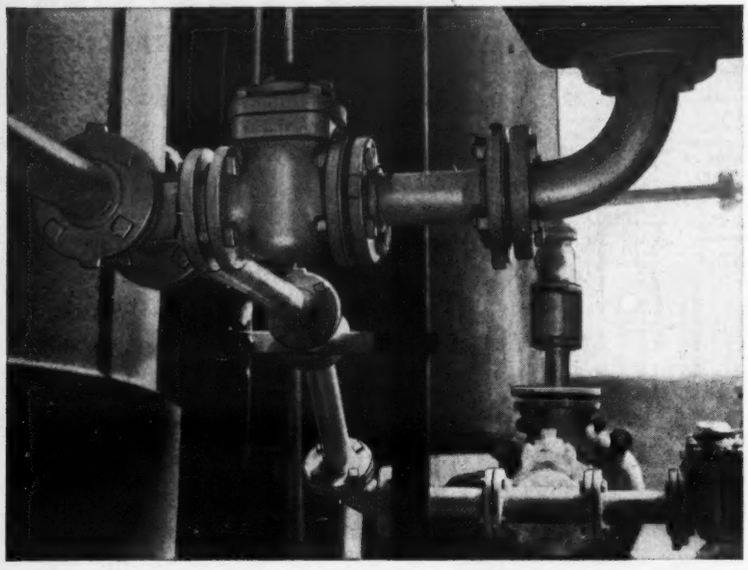
with typical applications, flow charts, description and specifications of models of various capacities and constructions. Inquiry Data Sheet included from which we can make specific engineering recommendation for your processing requirement. Write Lapp Insulator Co., Inc., Process Equipment Division, 363 Wilson Street, Le Roy, New York.

When inquiring check CP 4089 on handy form, pgs. 2-3

DOW

SARAN LINED PIPE CHOSEN TO RESIST CORROSION

And it has meant trouble-free service for this Illinois manufacturer, conveying hydrochloric acid at temperatures from 20° to 90° F.



The durable, corrosion-resistant lining of these 2½" saran lined pipe, fittings and valves have paid off for an Illinois manufacturer by eliminating costly shutdowns due to corrosion. And they've brought these additional advantages: 1. *Easy Installation* . . . saran lined pipe can be cut and threaded on the field using ordinary tools: no special equipment is needed! 2. *Added Safety* . . . the high-pressure strength of this steel-clad pipe eliminates danger caused by bursting pipe! 3. *No Leakage* . . . saran lined pipe, fittings and valves form snug, leak-proof joints!

If your operation requires the conveying of corrosive liquids, investigate saran lined pipe, fittings and valves. For further information contact The Saran Lined Pipe Company. THE DOW CHEMICAL COMPANY. Midland, Michigan.

RELATED SARAN PRODUCTS—Saran rubber tank lining • Saran rubber molding stock • Saran tubing and fittings • Saran pipe and fittings.

Saran Lined Pipe Company
2415 Burdette Ave., Ferndale 20, Michigan

Please send me a copy of your catalog on saran lined pipe, fittings and valves.

Name_____ Title_____

Company_____

Address_____

City_____ State_____

SP 11628

you can depend on DOW PLASTICS DOW

When inquiring check CP 4090 on handy form, pgs. 2-3

Six-way protection given by plastic coating . . .

can be sprayed or brushed on indoors or out

Uses: On metal structures or equipment, indoors or out, where protection is needed due to corrosive conditions.

Features: Self-adhering, plastic coating protects metal surfaces in six ways: weatherproofs, rustproofs and stops corrosion, seals vapors in or out, protects against acids and other corrosives, controls sweating and deadens sounds, and insulates.

Description: Protective coating, called Mortex 77, is compounded from ground cork insulating fillers and a bituminous binder. It has a 100°F flash point. Spray application is recommended for large areas and brushing for smaller surfaces.

A wide range of colors is available by spraying colored roofing granules into material before it is dry, or by applying an aluminum finish coat. One gallon of coating will cover about 12 sq ft ⅛" thick, wet, or 3/32" thick, dry.

(Protective coating is a product of J. W. Mortell Co., Dept. CP, 530 Burch St., Kankakee, Ill. . . . or for more information check CP 4091 on handy form, pages 2 & 3.)

Cover rust preventatives and metal conditioners

Zinc phosphate surface conditioners for ferrous metals, a prefinish metal cleaner, and rust preventatives are described in three separate bulletins.

Form 2-567 gives extensive data on how to use a zinc phosphate surface conditioner for ferrous metals. Material described is for phosphatizing to condition metal surfaces for such purposes as paint adhesion. It is recommended for dip application only.

Form 2-307 describes and discusses advantages and applica-

PICCO

SOLVENTS

and

SOLVENT OILS

Complete Line • High Quality • Uniform

PICCO Coal Tar Aromatic Solvents are available in a complete series of grades, from low to high boiling points, each grade being carefully fractionated to closely maintain specifications.

Complete data on all grades, and samples for testing, will be sent upon request. Please specify application.

PENNSYLVANIA INDUSTRIAL CHEMICAL CORP.
CLAIRTON, PENNSYLVANIA

Plants at **Clairton, Pa.; West Elizabeth, Pa.; and Chester, Pa.**

District Sales Offices: New York, Chicago, Philadelphia, Pittsburgh, Detroit

When inquiring check CP 4092 on handy form, pgs. 2-3

YOUR COMPLETE SOURCE FOR
THICKENING AGENTS
EMULSIFIERS • BINDERS
FLOTATION AGENTS • ADHESIVES

ESTABLISHED 1851
Morningstar

STARCHES
•
DEXTRINES
•
SOLUBLE AND ETHERIZED STARCHES
•
WATER SOLUBLE GUMS
•
POLYVINYL ACETATE EMULSIONS
•

Our years of experience in supplying these products to textile mills, paper mills, chemical processing industries, etc., can be useful to your particular problem.

Tell us your needs—our complete line is bound to contain the answer to your requirements.

MORNINGSTAR, NICOL, INC.
Scientific Starch, Dextrine and Natural Gum Service
630 West 51st Street, New York 19, N. Y. • Phone: COlumbus 5-2860
1770 Canalport Avenue, Chicago 16, Illinois • Phone: CAnal 6-2219

When inquiring check CP 4093 on handy form, pgs. 2-3

AIR STERILIZATION

with activated carbon

ADSORBITE activated carbon is used to treat air for industrial operations requiring completely pure and sterile air.

This is especially important in food manufacture and biochemical processes.

Write, wire or call for information.

BARNEBEY-CHENEY Company

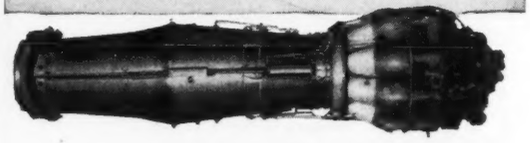
CASSADY AT EIGHTH COLUMBUS 19, OHIO

In Canada: BARNEBEY-CHENEY LTD., St. Johns, Quebec

When inquiring check CP 4094 on handy form, pgs. 2-3

Sicon Protects

HEAT RESISTANT FINISH



Small Parts For After-Burners OF PRATT & WHITNEY AIRCRAFT J48 TURBO JET ENGINE

No better proof of Sicon's remarkable film properties and color retention can be shown than this—its ability to protect jet engine parts under punishing high heat! Sicon is easy to apply by brush, spray, or dip to any chemically clean surface. For protection in the 1000°F. range, or for colorful whites, beiges, golds, greens, etc., in the 550°F. range—SICON *is* unbeatable.

Write today, without obligation, for revealing details of notable SICON applications on both industrial and consumer products.

MIDLAND Industrial Finishes Co.

EAST WATER ST., WAUKEGAN, ILLINOIS

ENAMELS · SYNTHETICS · LACQUERS · VARNISHES

When inquiring check CP 4095 on handy form, pgs. 2-3

tion of a pre-finish metal cleaner used to prepare steel surfaces for final finishing or painting.

Form 2-13C tabulates company's regular line of rust preventing materials and gives brief data on application, description, and use for each product described.

Forms 2-567, 2-307, and 2-13C are available from E. F. Houghton & Co., Dept. CP, 303 W. Lehigh Ave., Philadelphia 33, Pa. When inquiring specify CP 4096, pages 2 and 3.

Boiler water treatment comes pre-packaged, ready for use . . .

no complicated testing needed before application

Uses: To remove and prevent scale, corrosion, oil deposits, foaming and priming in boilers and cooling water systems.

Features: Material is simply and easily applied. It is reported to be fully effective in any plant. No complicated test procedures are necessary and application can be made by non-chemically trained personnel. Material comes prepackaged and ready for use.

Description: Water treating product, called Kemaloid, is manufactured from Douglas Fir waste wood. It contains no harmful acids or caustics. It will not damage any part of boiler, nor will damage result from carry-over live steam to materials under process. Material is a dry powder blend of organic and inorganic chemicals. Heavy chemicals used in product partially react with scale-forming minerals in water, inactivating them to a degree where the colloidal action of organic components can keep them in a completely fluid state, preventing organized scale or other deposits.

(Water treatment material is a product of C. C. McMillan, Industrial Supplies, Dept. CP, 3912 S.W. Dolph Court, Portland 19, Ore. . . . or for more information check CP 4097, pages 2 and 3.)

There's no middle ground with TANTALUM . . . its use is either pointless or imperative

The known properties of Tantalum, as well as countless "case histories" of its application, clearly define where this unusual acid-proof metal should be used. There's no guesswork in deciding on Tantalum . . . no compromise of its natural advantages.

If you are processing hot or strong acid solutions, if you are making a pure product in which equipment contamination or side reactions cannot be tolerated, Tantalum might be wisely employed. Taking a closer look, if the multiple costs of product spoilage, equipment maintenance and repair, shutdowns, and labor dislocations outweigh the single cost of Tantalum, Tantalum is indeed imperative.

Call in a Fansteel engineer to help you decide on your possible need for Tantalum.

Use Tantalum with economy for most acid solutions and corrosive gases or vapors except HF, alkalis, or substances containing free SO_3.

Ask for a copy of our free booklet "Acid-Proof Tantalum Equipment for Chemical Operations"

FANSTEEL METALLURGICAL CORPORATION

NORTH CHICAGO, ILLINOIS, U.S.A.

32404C

When inquiring check CP 4098 on handy form, pgs. 2-3

Subject: lead sheet and pipe

You may say that lead pipe and lead sheet are pretty much alike no matter who makes them or from whom you buy them. "Pretty much alike" is right. But not exactly alike. Here's why . . .

Federated's experience in lead production and in lead research means that you profit two ways when you buy corrosion-resisting lead pipe, sheet, valves or fittings from Federated: You get a product that is *certain* to be as good as any other . . . and probably better . . . *and* you get the *best technical help* with your problem.

For any information on the use of lead, write to Federated's *Corrosion Advisory Service*. Address the main office (below) or any one of Federated's 14 plants and 24 sales offices across the nation.

Federated Metals Division

AMERICAN SMELTING AND REFINING COMPANY
120 BROADWAY, NEW YORK 5, N. Y.
In Canada: Federated Metals Canada, Ltd., Toronto and Montreal

Aluminum, Magnesium, Babbitts, Brass, Bronze, Anodes, Zinc Dust, Die Casting Metals, Lead and Lead Products, Solders, Type Metals

When inquiring check CP 4099 on handy form, pgs. 2-3

Save Time and Money on Tower Packings

Specify KNOX *for initial installations*

as well as replacements

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- KNOX PRODUCES PORCELAIN TOWER PACKINGS FROM THE SAME COMPOSITION AS IS USED FOR HIGH VOLTAGE ELECTRIC PORCELAINS.
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- WIDE RANGE OF DESIGNS.
- UNIFORM QUALITY.

If you're interested in Better Tower Packings at lower Operating Cost, we'll be glad to send more information, prices and samples on request.

NOTE: We also manufacture Special Porcelain Items for the Chemical Industry — send Drawings or Samples for Quotations.

Double Spiral Ring

Triple Spiral Ring

Berl Saddle

MANUFACTURED BY
KNOX PORCELAIN CORPORATION
KNOXVILLE 1, TENNESSEE

When inquiring check CP 4100 on handy form, pgs. 2-3

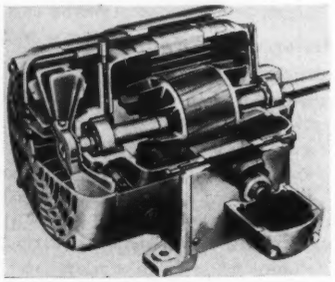
CORROSION CONTROL

Damaging atmospheres won't deteriorate electric motor . . .

unit is explosion-proof and protected from corrosion

Uses: In dangerous and damaging atmospheres.

Features: Construction features of motor include: stainless steel stator band, stainless fan cover guard, cast-iron conduit box, and cast-iron or cast bronze ventilating fan for totally-enclosed or explosion-proof service.


UL-approved for explosion-proof service

Screws and fittings exposed to atmosphere are cadmium plated. Bearing caps are elongated and moisture drain double sealed.

Description: Corrosion-protected motor, designated Type SD and SE, is produced in ratings from 3 to 150 hp. It is UL-approved for explosion-proof service.

(Electric motor is a product of US Electrical Motors, Inc., Dept. CP, Box 2058, Los Angeles 54, Calif. Check CP 4101, pages 2-3.)

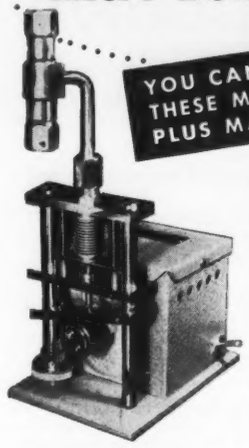
Tabulates resistance of plastic pipe

Detailed listing of resistance of rigid PVC pipe and fittings to a broad group of corrosives is included in bulletin.

Bulletin on Alpha 101 and 103 rigid PVC pipe and fittings is available from Alpha Plastics Inc., Dept. CP, 14 Northfield Road, West Orange, N. J. Specify CP 4102, pages 2 and 3.

With the
CORSON-CERVENY
Micro-Bellows Pump

YOU CAN HANDLE ALL THESE MATERIALS — PLUS MANY MORE:



Acetaldehyde
Acetic Acid
Acetone
Aniline
Benzaldehyde
Benzene
Ethyl Benzene
Carbon Disulfide
Carbon Tetrachloride
Cyclohexane
Dioxane
Ethanol
Formalin
Isopropyl Alcohol
Methanol
Pyridine
Toluene
Water

We have a booklet that gives all construction, operation and application details of the Corson-Cerveny Micro-Bellows Pump. Write for your copy.

RESEARCH APPLIANCE COMPANY
Box 463, West View Road, Pittsburgh 9, Pa.

When inquiring check CP 4103 on handy form, pgs. 2-3

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Printed on loose leaf, 6 hole, 6¾" x 3¾" bond paper, each book contains about 140 pages of technical data, presenting condensed, accurate and essential data for the student, engineer, technical worker and business man.

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Lumber Data	Transformers, Relays, Meters	Phys. and Thermodynamic Data
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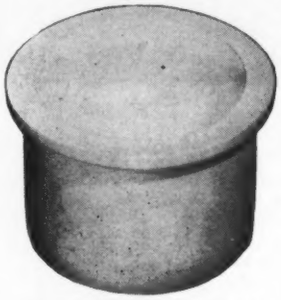
LEFAX Dept. CHP 9 Philadelphia 7, Pa.

When inquiring check CP 4104 on handy form, pgs. 2-3

Porous Teflon, stainless media well-suited for filtering corrosive materials

Porous Teflon may provide the answer to many filter media corrosion problems encountered in fine and extra fine (1 to 65 micron) filtrations. Resistant to strong acids, caustic, oxidizing agents, and organic solvents, the inert polymer possesses characteristics which make it suitable for many uses. With it engineers can depend upon uniform properties with age, as well as serviceability — regardless of changes in corrodibility of material being filtered.

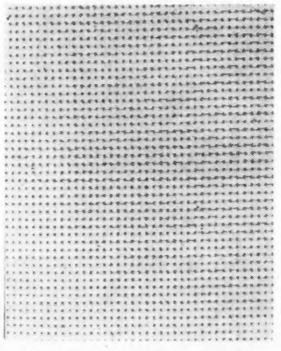


Porous Teflon molded filter cup withstands consecutive use of aqua regia, fuming nitric acid, and hydrofluoric acid

Used in filters for fuming nitric acid, hydrofluoric acid, and aqua regia, there is no change in weight, appearance, or strength noted.

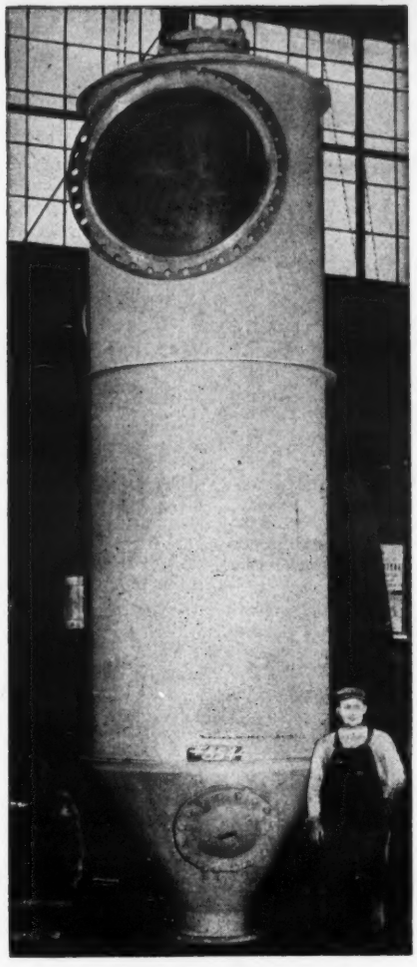
In the case of a few hydrocarbons, particularly those highly halogenated, some absorption and swelling may take place, but in most cases this process is reversible and does not exempt use of the polymer.

In nearly all cases, pressure drop across the media itself is negligible compared with pressure drop developed as filtered solids collect on or in pores of the filter. Other advantages: non-breakable, chip-proof, tear-resistant, lightweight, re-usable, no thermal breakage, high filtration efficiency, lint-free. Elements are available in variety of forms. Stainless steel and monel meshes are also solving problems in filter corrosion. Possessing high rigidity and tensiles, they are available in grades from strainers of ¼″ holes or larger, to 5 and 10 micron filters. Called "Rigimesh", the elements offer advantages of through filtration (straight pores) and formibility.



Surface of stainless steel filter element

(Porous Teflon and Rigimesh filter media are product of The Pall Filtration Companies, Dept. CP, Glen Cove, New York . . . or for more information check CP 4105 on the convenient Reader Service slip located between pages 2 and 3.)



Monel Barometric Condenser — This is a parallel-flow type (class "IT") barometric condenser for a sugar refinery. Designed by Mr. Henry E. Byer, the condenser has a shell of Monel-Clad Steel. The internal fixtures are solid Monel.

Outstanding feature of this Byer condenser is the simplicity that makes it easy to maintain, as well as less expensive to build. There are no jets to become clogged, no maze of baffles and weirs. Yet, its design provides a large water contact surface. And its Monel construction provides maximum resistance to corrosion from the brackish bay water used by the refinery for cooling purposes.

If you would like to know more about these Monel barometric condensers, write to Mr. Byer at 77 River St., Hoboken, N. J.

How Monel protects barometric condenser from brackish bay water

Six years ago, a large eastern sugar refinery needed a new barometric condenser with which their cooling water could not "raise cain".

The refinery is situated at the back end of a brackish bay. The bay water is not only salty but also highly contaminated at times and constitutes a bad corrosion problem.

The company tested a number of alloys for the new condenser and found that strong, easily-fabricated Monel® had the corrosion resistance they needed. They finally installed a Class "W" Byer condenser with a Monel-Clad Steel shell and solid Monel internals. Since that initial installation, they have subsequently purchased 3 more Byer condensers of Monel construction.

Monel, whether used alone or as cladding, makes an ideal material for much equipment subject to severe corrosive attack from sea water. In processing plants across the country, it is being used for heat exchanger tubes and tube sheets; for pump impellers, shafts, shaft sleeves and valves; as well as for screens, flanges, elbows, bolts, nuts and studs.

And in your plant . . . ? Perhaps you have a specific water corrosion problem that Monel or one of the other Inco Nickel Alloys can solve. If you do, write our Corrosion Engineering Section about it.

The INTERNATIONAL NICKEL COMPANY, Inc.
67 Wall Street **New York 5, N. Y.**

INCO Nickel Alloys

Monel... *for minimum maintenance*

When inquiring check CP 4106 on handy form, pgs. 2-3

Want to forget about rust for 20 years?

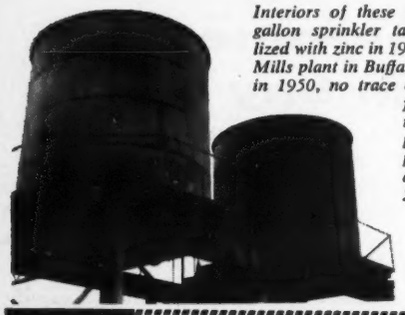
Pure zinc or aluminum, molten-sprayed on iron or steel surfaces, provides positive, dependable protection against atmospheric corrosion for upwards of 20 years without *any* further maintenance.

These unique coatings are *mechanically* bonded to the surface—adhesion is *not* dependent on volatile vehicles or binders. Scaling, crazing, blisters are eliminated. Protection is *positive.* "Metallize 'em and forget 'em!"

Why not find out more about how you can forget about rust on iron and steel structures and equipment—eliminate the nuisance and expense of constant painting and repainting? Write for descriptive Bulletin 62-B—it's free.

the Metco Systems*

—a series of 18 basic engineering specifications developed over 19 years of experience with pure zinc and aluminum coatings on many different types of structures and equipment in a wide range of corrosive conditions. The *Metco Systems* provide for standardization of surface preparation, coating thicknesses and organic aftercoatings for various surface conditions and appearance requirements.



Interiors of these two steel 15,000 gallon sprinkler tanks were metallized with zinc in 1934 at the General Mills plant in Buffalo. Last inspected in 1950, no trace of rust could be found, and zinc remaining is expected to provide protection for an additional 15 to 20 years.

Metallizing Engineering Co., Inc.
1143 Prospect Ave., Westbury, L. I., New York • cable: METCO
In Great Britain:
METALLIZING EQUIPMENT COMPANY, LTD.—Chobham near Woking, England

DON A. WATSON METALLIZING ENGINEERING CO., INC.
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☐ Please have Metco Field Engineer call.
NAME_____
COMPANY_____
STREET_____
CITY_____ ZONE_____ STATE_____

When inquiring check CP 4107 on handy form, pgs. 2-3

Simplicity of application marks use of protective coating . . .

no catalysts or accelerators are required

Uses: Protection against acids and alkali fumes and splash.

Features: Coating is simple to apply. No catalysts or accelerators are needed. Only wirebrushing of metal surfaces to remove rust, scale and dirt is necessary before coating is brushed or sprayed on.

One coat of primer and two coats of protective material gives final thickness of 7 mils, on flat or vertical surfaces. Drying time between coats is about one-half hour (one hour for primer).

Description: Neoprene "W" is a one component neoprene synthetic coating. It shows excellent resistance to abrasion and weathering. Coverage is 375 mil feet per gallon (125 sq ft of 3 mil film).

(Protective coating is a product of Carboline Co., a div. of Mullins Non-Ferrous Castings Corp., Dept. CP, 331 Thornton Ave., St. Louis 19, Mo. . . . or for more information check CP 4108 on handy form, pages 2 and 3.)

Review of literature on specialty steels

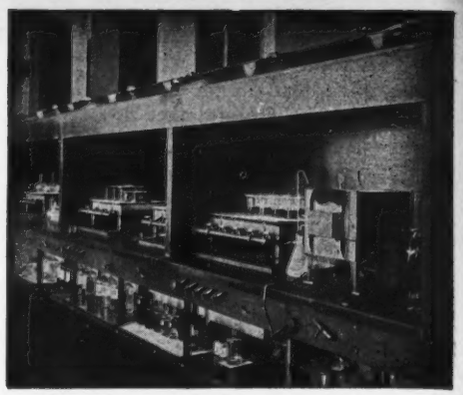
Catalog of 12 pages lists and briefly describes literature, technical aids, and data sheets published by company to aid utilization of specialty steel products.

Specific literature covers tools steels, Rezistal stainless steels, magnets, castings, and rolled and drawn steels.

General literature available includes handy charts on hardenability of steel, decimal equivalents, and temperature ranges.

Cat TA 1 is issued by Crucible Steel Co. of America, Dept. CP, P.O. Box 88, Oliver Bldg., Pittsburgh 30, Pa. When inquiring specify CP 4109 on convenient slip, pages 2 and 3.

make Perchloric Acid handling safer!



Alberene Perchloric Hoods in Research Laboratory, International Nickel Company, Inc., Bayonne, New Jersey

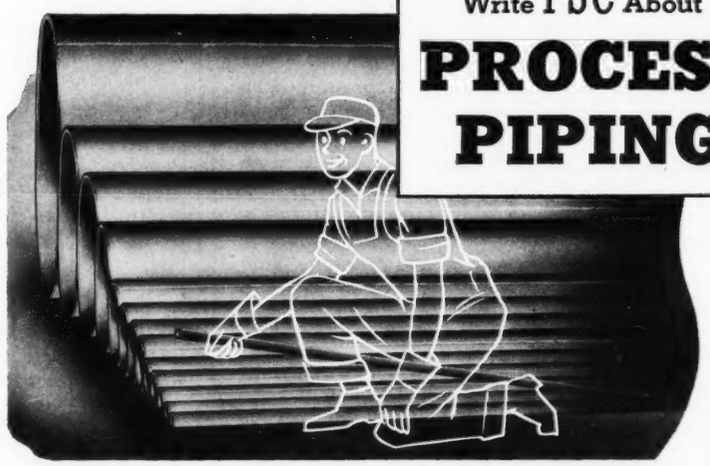
Precautions that must be taken in handling perchloric acid make special hoods a necessity. Now Alberene Stone offers you fume hoods *specially designed* to reduce hazards in working with perchloric acid . . . *specially designed* to give you greater safety. For prompt advice on any of your fume problems write Alberene Stone Corporation of Virginia, 419 4th Ave., N. Y. 16, N. Y., or visit our nearest branch office.

FREE REPRINTS of an article giving helpful hints on safe handling of perchloric acid are yours for the asking. Just write today on your company letterhead.

ALBERENE STONE
Branches in Principal Cities

When inquiring check CP 4110 on handy form, pgs. 2-3

Write PSC About
PROCESS PIPING



Fabricated from Complete Range of Alloys, Any Diameter Up to 60", and in Any Shape

PSC welded process tubing is furnished in any alloy whatsoever. This feature accounts for its wide application in meeting the unlimited variety of heat, corrosion, oxidation conditions in process plants.

Any diameter up to 60"; wall thicknesses to 3/8"; temperatures to 2200°. Precision fabrication of tubing assemblies is a specialty. Send b/p or write as to your needs.

THE PRESSED STEEL CO., 709 N. Penna. Ave., Wilkes-Barre, Pa.

Custom Fabricators for the Process Industries Since 1928. Send Your Blue Prints

When inquiring check CP 4111 on handy form, pgs. 2-3

basic PUMP SELECTION GUIDE

Learn BASIC FACTS before deciding on TYPE of PUMP

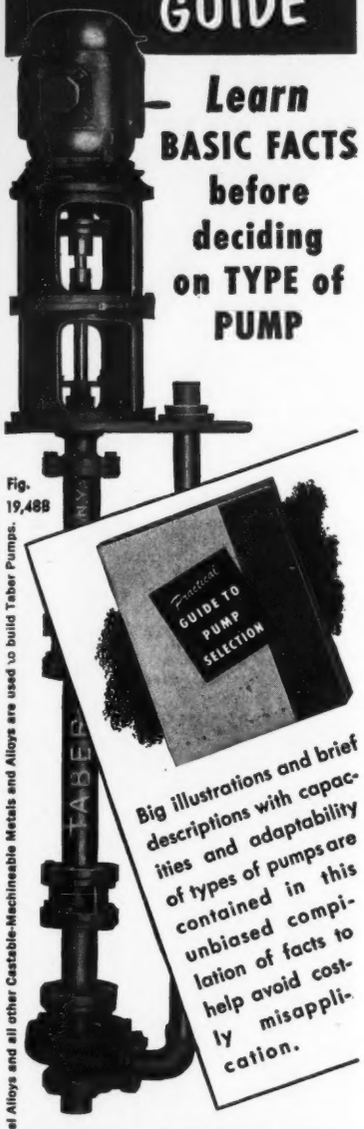


Fig. 19,488

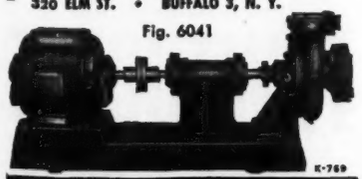
Big illustrations and brief descriptions with capacities and adaptability of types of pumps are contained in this unbiased compilation of facts to help avoid costly misapplication.

Nickel, Nickel Alloys and all other Castable-Machineable Metals and Alloys are used to build Taber Pumps.

WRITE for BULLETIN S-146
on your company stationery, please.

TABER PUMP CO. (Est. 1859)
320 ELM ST. • BUFFALO 3, N. Y.

Fig. 6041



K-769

TABER

When inquiring check CP 4112 on handy form, pgs. 2-3

Storage tanks, equipment and tank cars protected against corrosion using special linings

Three special linings intended for application on equipment subject to corrosive attack have recently been developed.

LC-34 Modified epoxy-phenolic thermosetting lining. Has higher degree of flexibility than straight phenolic. Resistant to solvents, salts and dilute mineral acids. Has general alkaline and specifically, caustic soda resistance. Used at present for tank car linings where 73% caustic soda solution is loaded at 170°F. Also is being used for tank cars, storage tanks, churns and pipe lines, to carry rubber latex solutions where alkalinity ranges up to pH 12. In latter case, lining stops metallic contamination and allows coagulated film to be stripped off in sheets.

LC-73 Straight thermosetting phenolic with high resistance qualities of phenolics plus resistance to concentrated sulfuric acid and 70% orthophosphoric acid at 170°F. Used for storage tanks and tank cars.

LC-610 Modified epoxy-phenolic that may be air-cured and delivered in liquid form. Product needs no primer and has very good adhesion to wood, concrete and most metal surfaces. Has good all-around resistance to weathering. Does not resist concentrated sulfuric and nitric acid and is softened in contact with ketones and chlorinated solvents.

(Coatings are a product of Lithcote Corp., Dept. CP, 333 West 40th Place, Chicago 9, Ill. . . . or for more information check CP 4113 on handy form, pages 2 and 3.)

Localized corrosion due to welding or contact with graphite or rubber avoided with titanium . . .

metal is advantageous for chlorides and nitric, shows promise for acetic and phenol

Technical paper on titanium points out that one of the chief advantages of the metal in chemical applications is that it is not subject to corrosion due to welding, contact with graphite or carbon, or other forms of localized attack. This property, plus its high resistance to chlorides and to oxidizing agents such as nitric or chromic acid, are of

(*Continued on next page*)

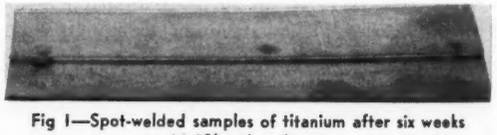


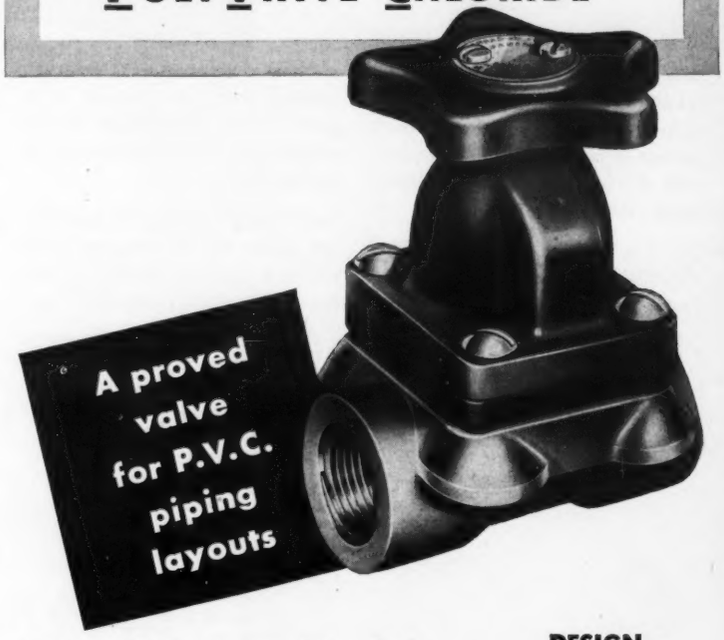
Fig 1—Spot-welded samples of titanium after six weeks in 5% salt solution

Announcing

HILLS-McCANNA

Saunders Patent

DIAPHRAGM VALVES with bodies of POLYVINYL CHLORIDE



With the addition of valves with unplasticized, rigid polyvinyl chloride (P.V.C.) bodies, Hills-McCanna further expands the most extensive line of corrosion-resistant valves. Now, the corrosion resistance and rugged durability of P.V.C. is available in a valve of proved and accepted design.

Hills-McCanna P.V.C. valves are available in handwheel or lever operated types or with air cylinder, diaphragm motor or electric motor operators for remote or automatic control. Sizes range from ½" through 2". All regular diaphragm materials are available (rubber, Neoprene, Kel-F, Teflon, etc.). Screwed ends are standard. Slip fits available on special order.

Write for further information. HILLS-McCANNA CO., 2370 W. Nelson St., Chicago 18, Ill.

DESIGN DETAILS

- Working parts isolated from flow.
- No packing.
- Leaktight under pressure or vacuum.
- Simple pinch clamp closure principle.
- Minimum maintenance even in the severest service.

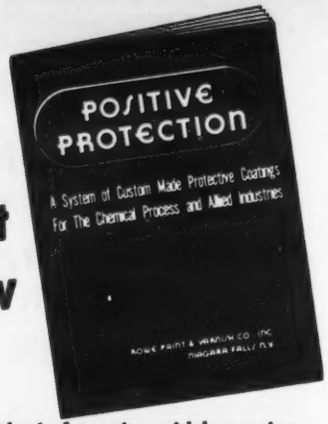
HILLS-McCANNA

saunders patent diaphragm valves

Also manufacturers of
Chemical Proportioning Pumps • Force-Feed Lubricators
Magnesium Alloy Sand Castings

When inquiring check CP 4114 on handy form, pgs. 2-3

Reduce Surface Protection Costs



This Free Booklet Tells How

Whether you are constructing a new plant or addition, or maintaining existing structures, you can be sure of achieving the lowest cost protection per square foot per year with the Rowe System of Custom Made Protective Coatings.

This free booklet — POSITIVE PROTECTION — tells how the Rowe System provides a "custom made" method of meeting widely varying coating requirements and anticipates every detail from surface preparation to application recommendations.

Here's good news indeed for chemical plant superintendents, paint foremen and purchasing agents. For your free copy, write to . . .

ROWE PAINT & VARNISH CO., INC.
COLLEGE AVENUE AND HYDE PARK BOULEVARD
NIAGARA FALLS, N.Y.

When inquiring check CP 4115 on handy form, pgs. 2-3

What type thermometer is most easily adapted to **YOUR** *installation?*

Because the stem can be located anywhere around the dial, straight-form thermometers are easily adapted to practically any installation. Here's a Rochester Thermometer that gives you the adaptability of a straight-form PLUS two big Rochester Thermometer exclusives.

DURABILITY — All stainless steel construction (except crystal) means that you'll have an instrument that gives long service even in highly corrosive atmospheres. Even the welds are stainless steel for *positive* sealing. Rochester Straight-Form Thermometer dials are hermetically sealed to give you easy reading — always clear, never clouded.

EXTERNAL RECALIBRATION — It takes a hard blow to knock a Rochester Thermometer out of adjustment, but, if it should happen, you can recalibrate the Straight-Form yourself with a simple *external* adjustment — a Rochester exclusive.

The Rochester Straight-Form Thermometer is ordinarily supplied with the stem located at the bottom, but it's easily placed at any position around the dial that you want. Available in stem lengths from 2½" to 48". For more information on Rochester Straight-Form and other thermometers, write:

Rochester Manufacturing Company, Inc.
86 Rockwood St., Rochester 10, N. Y.
ROCHESTER DEPENDABLE ACCURACY GAUGES
DIAL THERMOMETERS GAUGES AMMETERS

When inquiring check CP 4116 on handy form, pgs. 2-3

(*Continued from preceding page*)

most benefit in present applications. Laboratory tests show promise for successful use of metal for handling acetic acid and phenol.

Samples of titanium spot welded to form a crevice, as shown in Fig 1, show no evidence of localized corrosion after six weeks in 5% NaCl solution. Localized corrosion is often caused on metals by gaskets impregnated with graphite or containing rubber. Left portion of Fig 2 shows corrosion which occurred with a common metal, on which graphite was placed, was left in 20% salt spray for 30 days. Titanium sample on right shows no evidence of corrosion under same conditions.

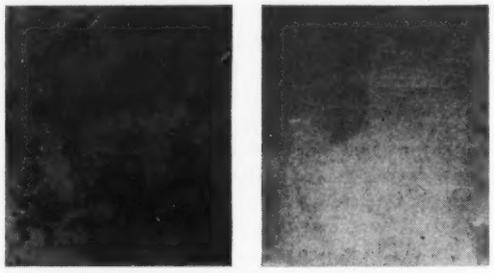


Fig 2—Common metal (left) and titanium (right), on which graphite was placed and samples subjected to 20% salt spray for 30 days

Pitting or localized surface attack is resisted extremely well by titanium, particularly when handling severe pitting reagents such as ferric chloride, cupric chloride, or hypochlorites. Crevices, such as occur in corners, do not cause corrosion of titanium.

Fuming nitric acid is withstood by the metal at temperatures up to 160°F. Although not resistant to strong hydrochloric and sulfuric acids in pure state, addition of a small amount of an oxidizing agent such as nitric acid, inhibits attack. Thus, titanium is resistant to aqua regia.

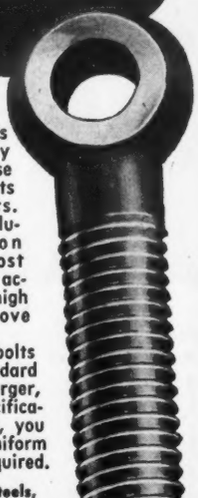
Although not suitable for dry chlorine gas, titanium offers a possible solution to the problem of handling wet chlorine. Laboratory tests indicate service tests are advisable for use of metal in acetic acid, lactic acid, tartaric acid, phenols, and chlorinated hydrocarbons. Some troubles encountered with molten sulfur may be overcome with titanium. Consideration of the metal for use with moist gases containing SO_2 or H_2S is feasible.

(Condensed from technical paper, "Important Advantages of Titanium in the Chemical Processing Industry," by W. G. Renshaw and P. R. Bish, Allegheny Ludlum Steel Corp., Brackenridge, Pa. Paper was delivered at the 1954 annual meeting of the National Association of Corrosion Engineers in Kansas City, Mo.)

(For further information contact Titanium Metals Corp. of America, 233 Broadway, New York 7, N. Y. . . . or check CP 4117, pages 2 and 3.)

Threaded Specialties

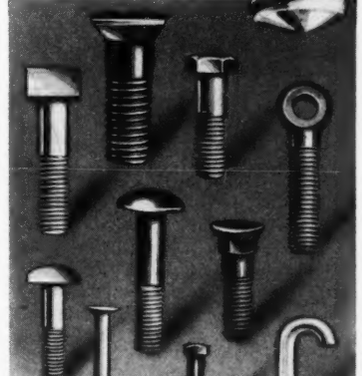
lower cost
EYE BOLTS
by an exclusive method



Among Pawtucket's many specialty products are these lower-cost eye bolts or "swing" bolts. Pawtucket's exclusive production method keeps cost low, dimensional accuracy unusually high and strength above standard.

Pawtucket eye bolts are made in standard sizes ¼" and larger, or to your specifications. In any size, you can depend on uniform Class 3 fit, if required.

All standard steels, stainless steels and non-ferrous metals, including Titanium



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THE PLACE TO SOLVE YOUR BOLT PROBLEMS
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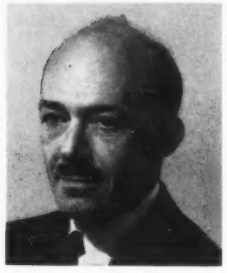
When inquiring check CP 4118 on handy form, pgs. 2-3



the battle against corrosion

(*Continued from page* 51)

available a tremendous range of chemical inertness and abilities to withstand temperatures much higher than usual for plastics. New developments are adding other plastics as effective means of defeating corrosion.

By reinforcing chemically-resistant Epon resin with glass fibers it is possible to construct pipe and other items of process equipment with the requisite strength and great advantage of chemical inertness. Extruded, rigid polyvinyl chloride is available as pipe and in other shapes for process applications.

Protective Coatings — Many advances have been made in recent years on coatings for protection of equipment against corrosion. Acid-proof glass linings with improved resistance to alkali are a recent development. Organic coatings based on Epon and vinyl resins are being used to an increasing degree for external protection of process equipment. Of interest as internal coatings are Epon and a new resin, poly chlorofluoro ethylene (Kel-F).

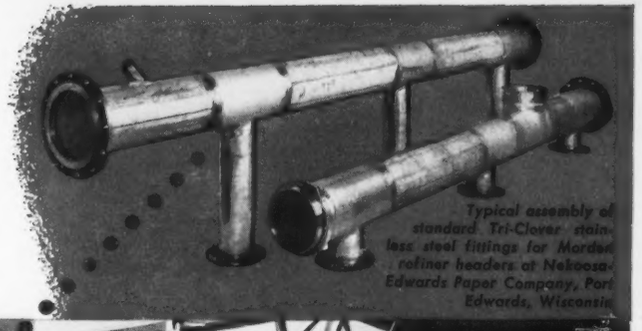
Corrosion Inhibitors — A likeness may be seen between corrosion inhibitors and drugs for the treatment of disease. Minute amounts of the proper chemical added to the process stream may effectively stop corrosion. Like drugs, they are fairly specific and are useful only in particular cases. It is common practice to treat process cooling water with inhibitors, but only infrequent use of this method is made for process streams. It has the attractive feature, when applicable, of stopping corrosion already in progress and thus greatly extending the life of equipment which otherwise would need early replacement.

Process Revision — Occasionally, when corrosion is a critical function of some process variable, such as temperature or flow velocity, it may be possible to avoid excessive damage by a relatively minor change in that process condition. This, of course, requires full knowledge of effects of changes in such variables on the rate of corrosive attack. Although not always applicable or feasible, this method is a useful one frequently overlooked.

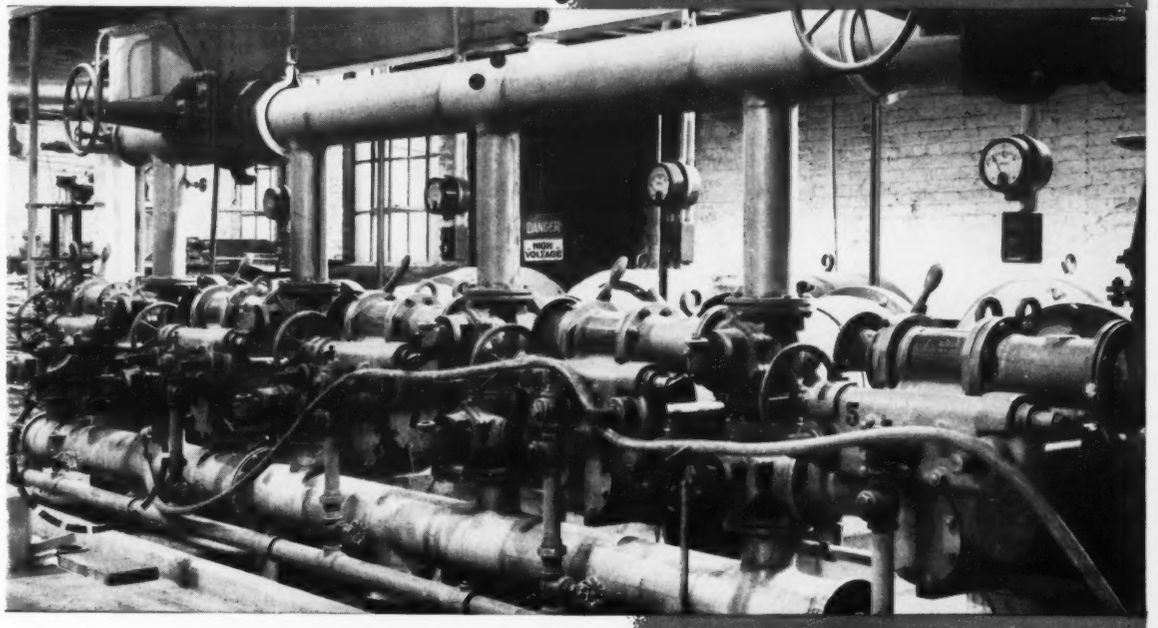
Cathodic Protection — Methods of cathodic protection have seen great success and have been the object of much development activity in the protection

(*Continued on next page*)

Save Time and Money on Corrosion-Resistant Line Assemblies . . .



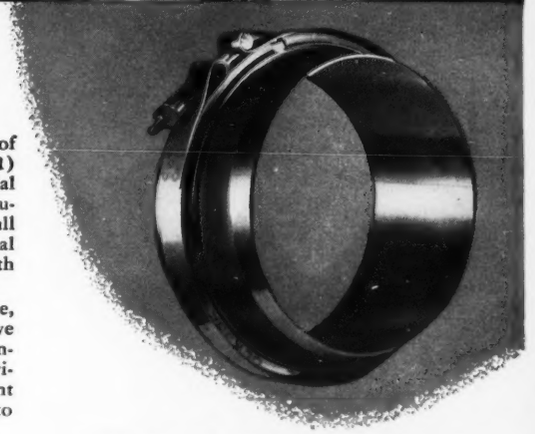
Typical assembly of standard Tri-Clover stainless steel fittings for Mordenite refiner headers at Nekoosa-Edwards Paper Company, Port Edwards, Wisconsin



. . . with TRI-CLOVER Stainless Steel Fittings

Among the most important factors governing the selection of corrosion-resistant fittings, piping and line assemblies are: (1) The assurance of *full* corrosion-resistance in the actual material *and* in the finished assemblies; (2) The assurance that the manufacturer has had ample experience and ability in producing a full range of corrosion-resistant material; and (3) assurance that actual costs for installation will be as low as possible, commensurate with the quality of the finished assemblies.

When you specify *TRI-CLOVER* stainless steel fittings, pipe, tubing and pumps you can be *sure* that all of the above factors have been met . . . And you can be *sure* that you are getting *full* corrosion-resistance in *every* fitting and fitting assembly . . . thanks to Tri-Clover's specialized experience in solving corrosion-resistant piping problems for chemical-process industries from coast to coast.



STAINLESS STEEL CLAMP-TYPE CONICAL FITTINGS . . . requires only two simple ferrules and clamp to assure leak-tight joints thru the use of Teflon gaskets. Fast, simple assembly and disassembly—Just one of the complete range of Tri-Clover Stainless Steel fitting types to meet practically every corrosion-resistant piping requirement.

See your nearest TRI-CLOVER DISTRIBUTOR
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Tri-Clover Division
KENOSHA WISCONSIN
THE Complete LINE

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When inquiring check CP 4119 on handy form, pgs. 2-3

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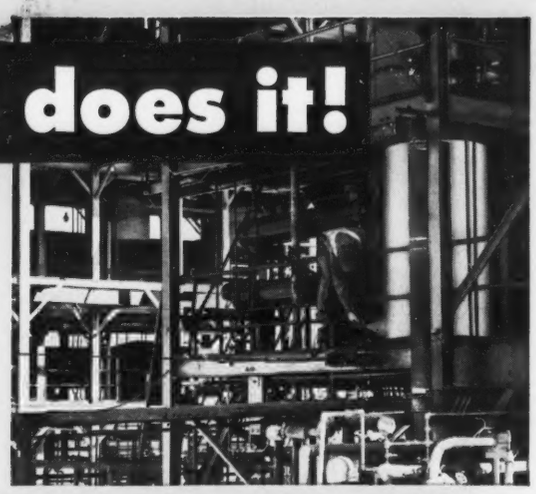
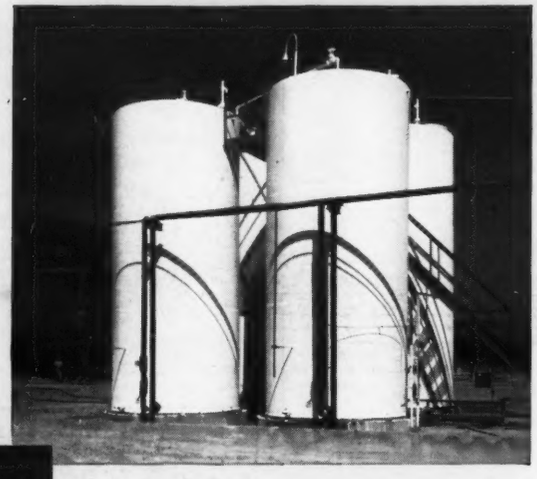


New paint lasts years ...resists corrosive spillage at Diamond Alkali plant



HERE'S HOW...

PAINT LEADS a hard life at the Diamond Alkali Company agricultural chemicals plant in Houston, Texas . . . and no ordinary paint can survive there for long!

A few reasons for paint failure: Processing vessels and storage tanks are subjected to spillage of chlorinated hydrocarbons and benzene, and some also to heat. In parts of the plant, painted surfaces are exposed to the highly corrosive fumes of hydrogen chloride and sulfuric acid.

In their search to find a tougher, longer lasting paint, Diamond Alkali maintenance men tried coatings of many types, including heavy duty maintenance finishes. Some "washed off" immediately; some lasted 6 to 8 months. Finally, Epon resin coatings based on the XA-200 formulation were tried — and found outstandingly successful.

The Epon cold-cured paint, applied by spraying throughout the entire plant, has been in service for *more than two years with no failure.* Painting costs — for both material and labor—are a mere fraction of what they formerly were, reports Diamond Alkali.

Call on our sales offices for names of suppliers who sell Epon resin coatings for your needs. Write for the full Epon coatings story in the new brochure, *"Planning to Paint a Pyramid?"*

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(Continued from preceding page)

of underground and marine structures. Although cathodic protection has not been used extensively with process equipment, it has proved successful in such applications as protecting open box heat exchangers. This method is attractive for existing corroding equipment, as well as new installations, but further developments are required pointed toward the conditions and needs of process industries.

To a large degree, efforts in corrosion control have been directed toward correction of problems that have arisen after plants were built and in operation. Benefits derived from such correction are obvious and often substantial. Increasing recognition is developing in industry that proper consideration of corrosion factors before the plant or unit is built can avoid the frequent necessity for high maintenance or replacement costs. Many plants have corrosion unnecessarily designed into them.

To gain the maximum benefits from existing knowledge of corrosion control methods, corrosion prevention should be exercised at the design stage of a plant. This is a direction in which considerable gains can be made.

For more information on product at left, specify CP 4120 . . . see information request blank between pages 2 and 3.

briefs

from contemporary publications

Humidity-temp relationships

Relative humidity - temperature relationships for air in equilibrium with saturated solutions of various salts are determined by the dew point method. Seven pages, 10 figures, 3 tables. (*"Journal of Research, National Bureau of Standards," July,* 1954, *page* 19.)

Analysis of fly ash

Four independent laboratories report on size-consist determinations made on eight samples of fly ash. Specific gravities are covered and terminal velocities of settling are calculated. Six pages, 7 figures, 2 tables. (*"Combustion," August,* 1954, *page* 41.)

Conveyor belts

Suggestions that aid in obtaining best results from elevator conveyor belts are presented. (*"Rubber Age," August,* 1954, *page* 690.)

Plant maintenance

Methods of conducting a program of plant maintenance are discussed under the headings of organization, lubrication, budgets, scheduling, utilities, corrosives, reports, buildings, and sanitation. (*"Food Engineering," August,* 1954, *page* 65.)

Uranium dust

The design of facilities for controlling dust, and for heating and ventilating in plants that produce uranium, is covered. Five pages, 3 figures, 4 references. (*"Heating, Piping and Air Conditioning," Sept.* '54, *p.* 109.)

Statistics

This discussion of the estimation of indeterminate errors ffom small groups of replicates calls attention to six statistical conclusions of value to chemists and chemical engineers. Four pages, 3 tables. (*"Journal of Chemical Education," September,* 1954, *page* 465.)

Chemical barking

Sodium arsenite and ammonium sulfanate can be used to loosen bark from hemlock and Douglas fir. Methods of applications and time of treatment are included. Two pages, 7 photographs. (*"Paper Industry," August,* 1954, *page* 488.)

Spark-ignition engines and the halocarbons

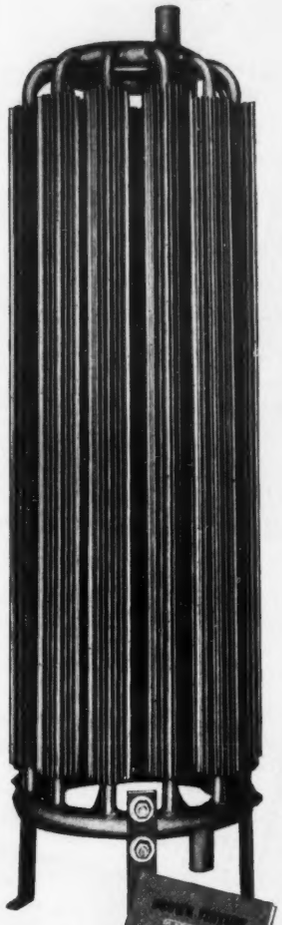
The addition of halocarbons to gasoline lengthens combustion time, increases liberation of energy, decreases knocking tendencies under conditions of constant power output. General Motors employed a single-cylinder gas engine in this study. Eight pages, 8 figures, 7 tables, 17 references. (*"Industrial and Engineering Chemistry," August,* 1954, *page* 1677.)

Industrial waste water

Steps in the design of a plant to treat industrial waste water include a study of process operation, effluent measurements, analysis of samples, investigation of state requirements, consideration of land available, comparison of batch and continuous treatment, study of the reuse of treated waste water, and reduction of material losses. (*"Wastes Engineering," September,* 1954, *page* 402.)

Vertical Mounting of

BROWN FINTUBE TF-18 TANK HEATERS ASSURES MORE EFFICIENT LESS COSTLY OPERATION



● Mounted on legs 10 inches above the tank floor, our TF-18 Heaters are entirely surrounded by the tank liquids. This prevents sediment from settling on the heating surfaces as when an old-fashioned coil in the bottom of the tank is used . . . assures more efficient, less costly heating . . . avoids heating through a layer of sediment . . . and leaves the tank floor uncluttered and easy to clean.

The finned construction provides approximately 7 times more heating surface per foot of tube length than plain bare pipe or tubing. Consequently, TF-18 Heaters transfer **more heat,** faster and at lower temperatures, avoiding coking or damage to heat sensitive materials. Easily installed in existing or new tanks. TF-18 Heaters **do not** require welding inside the tank. Tried, re-ordered and widely used by the country's leading petroleum and chemical concerns.

You can't keep your operations competitive with old fashioned, obsolete methods. Write today. Get full details about these new, fully proved, less costly, more efficient tank heaters.

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STOCK CHECKER'S TRUCK
Designed to handle a large variety of items or parts. Three steel shelves with 1" flanges all around. Floor clearance 9½". Overall height to top shelf 42½", top of table 50". 44" long, 20" wide. All steel welded construction. Semi-crated approx. 190 lbs.

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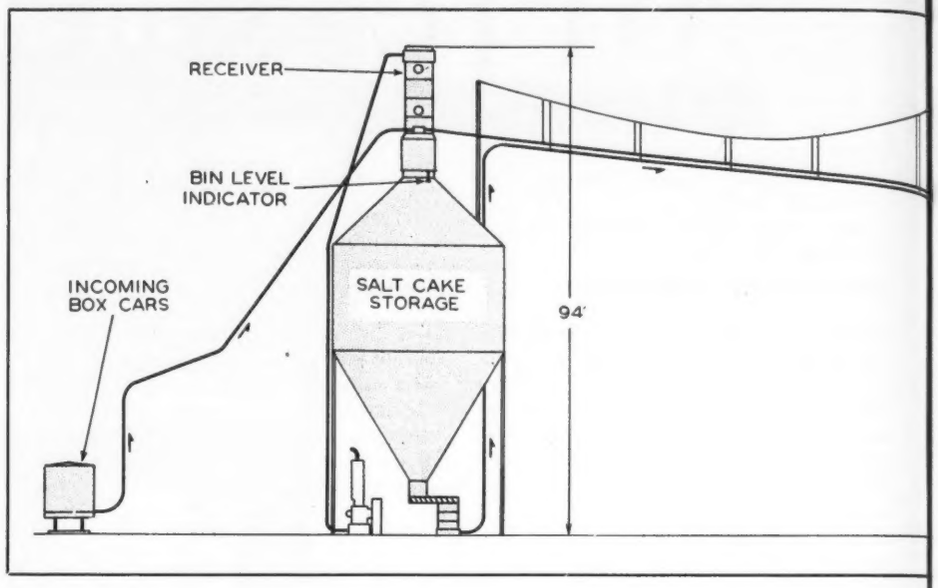


Loss and contamination cease when National Container switches to . . .

pneumatic handling of salt cake

New Georgia plant finds air conveyor cuts labor costs, stops spillage loss, and permits economical bulk purchasing

National Container Corporation's newest plant is a kraft pulp mill in the heart of the South at Valdosta, Georgia. Completely mechanized with interlocked instruments for automatic control, this outstanding new mill is designed to produce 500 tons of pulp per day.

Contributing to the automatic operation of this plant is a Dracco "Airstream" system for conveying salt cake. Large tonnages of salt cake (sodium sulfate) are consumed daily at National's plant to make up the cooking liquors necessary for making wood pulp.

At some of the other National Container mills, chain conveyor and bucket elevators were used to transport the salt cake. It was decided, however, that this method would not fit in with the highly automatic operations of the new mill. Hence, the decision to use pneumatic conveying.

The pneumatic system performs two vital materials

Receiver for pneumatic conveyor is located on top of salt cake storage tank. Salt cake, unloaded from box cars at track-side unloading station (lower right), is moved by suction to receiver. Receiver discharges salt cake to storage after separating it from conveying air. Later salt cake is moved to process through conveying line suspended from catenary

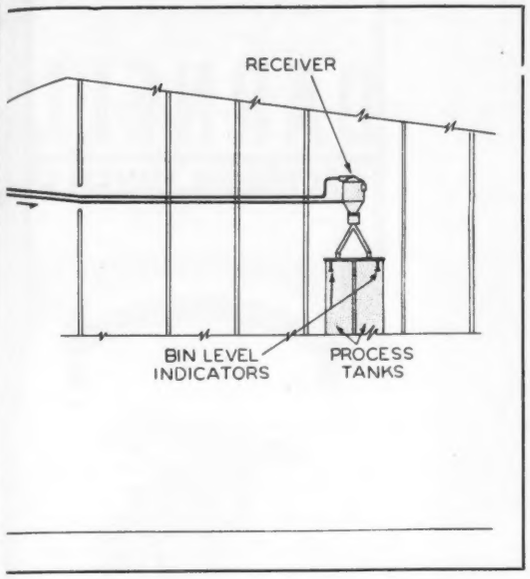
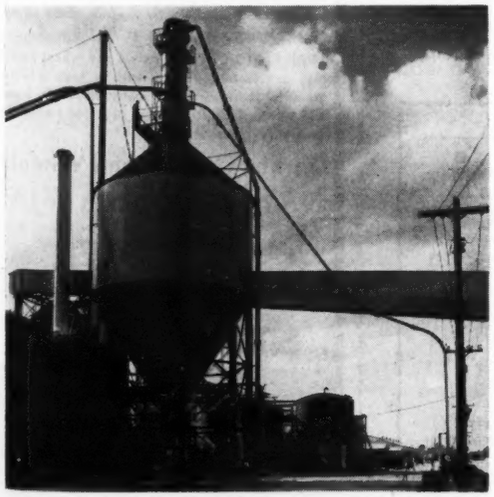


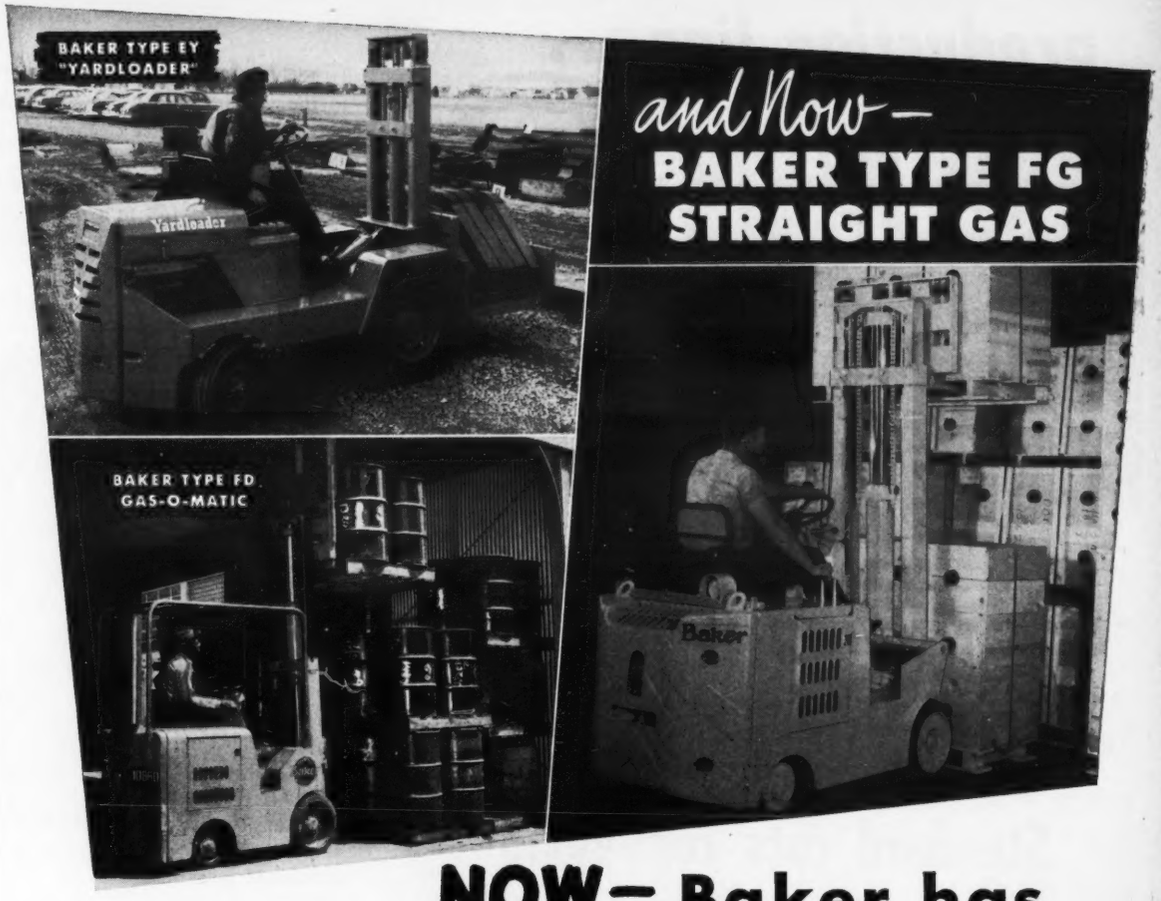
Diagram shows combination suction-pressure system at NCC plant. Salt cake is moved to storage by vacuum; then, as required for production, it is withdrawn from tank and blown to receiver over process tanks. Bin level indicators prevent over filling

handling jobs — 1) unloading to storage, and 2) transporting from storage to process. Incoming boxcars of salt cake are unloaded by one man from a track-side unloading station. All salt cake is moved directly to a 90-foot storage tank by the positive-action "Airstream" at 15 tons per hour — without loss or contamination. A 60-hp motor is connected

(*Continued on next page*)



View of pneumatic conveyor system for unloading salt cake from railroad cars to storage tank



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NOW— Baker has ALL THREE types of GAS FORK TRUCKS

● To its economy-priced, pneumatic-tired YARDLOADER and its premium GAS-O-MATIC line, Baker now adds the commercial version of its STRAIGHT-GAS fork truck—manufactured in quantity for the U. S. Armed Forces during the last two years. For ordinary fork truck applications this new Baker Type FG features low initial cost, low maintenance, speed and economy. It is built to the same high engineering standards that have characterized Baker electric trucks for over 35 years. Available in most wanted capacities.

If you need a fork truck for rugged outdoor-indoor handling—on rough floor or ground conditions—or where long hauls are involved, you can save up to $1,000 initial cost by buying the speedy Baker EY-40 "YARDLOADER"—pneumatic-tired, heavy-duty, gas-powered—the lowest priced fork truck in the 2-ton class.

Outstanding gas truck in the Baker line is the GAS-O-MATIC. The gas engine drives the exclusive GAS-O-MATIC generator to supply power to the Baker electric motor—giving electric truck performance and operating economy at premium gas truck initial cost. Gas consumption for normal service of 2-ton model about ½ gallons per hour. Capacities 4,000 to 6,000 pounds.

Descriptive bulletins are available. Write the Baker-Raulang Company, 1208 West 80th Street, Cleveland 2, Ohio.

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industrial trucks

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Nearly 50 years of conveyor experience

Standard cuts conveying costs in *either* or *both* places

To speed operations, reduce breakage, increase safety, save manpower, time and money — mechanize handling with Standard conveyors. *It's an investment in efficiency that will pay you for years.*

Standard can be of expert service to you on any conveyor need. This includes complete engineered systems of conveyors for production, assembly or packing lines . . . or a simple lightweight section of roller conveyor for "spot" use in warehouse or shipping room.

Standard designs and builds all types of "package" conveyors: power and gravity, belt, roller, slat, push-bar and special units as well as a wide line of self-contained portable work-savers.

The range, versatility and flexibility of Standard Conveyor equipment have been developed in nearly 50 years of service to industry. Call Standard's representative listed in your classified phone book. Send for Standard's General Catalog — address Dept. CP-124

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PNEUMATIC TUBE SYSTEMS

When inquiring check CP 4124 on handy form, pgs. 2-3

(Continued from preceding page)

to the vacuum system. Several smaller motors are also used in bag filter cleaning.

For daily production requirements, the pneumatic system withdraws salt cake from storage and conveys it some 175 feet to a nearby plant. There, the salt cake is discharged to process between "cascade" evaporators and furnace.

Dependable and efficient, moving bulk materials by air assures minimum labor costs, avoids losses thru spillage and permits economical bulk purchasing.

("Airstream" pneumatic conveyor system is a product of the Dracco Corp., Dept. CP, 4070 E. 116th St., Cleveland 5, Ohio. Check CP 4125, pages 2 and 3.)

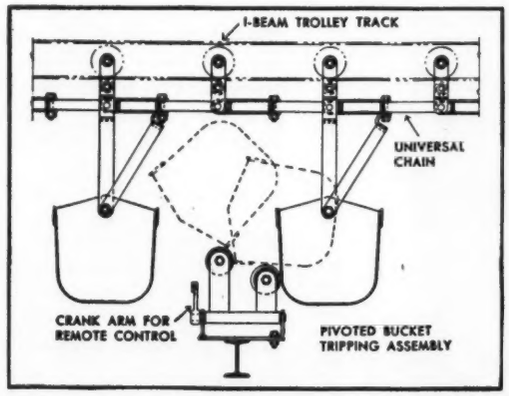
Automatically trips buckets to load, unload materials from conveyor

Uses: For automatic handling of bulk materials in buckets. Conveyors may be adapted for conveying pallets or baskets.

Features: Universal chain suspended from I-beam trolley permits vertical, inclined, or horizontal runs with turns or a combination of these directions. One drive unit powers conveyor. Tripping of buckets for loading and unloading operations is automatic.

Description: Conveyor trolley consists of single I-beam which may lie in a horizontal, inclined or vertical position, or include sections in all three directions. Standard roller attachments are used. Conveyor buckets are attached by two bracket braces to universal chain which runs parallel to I-beam.

Second brace holds bucket trunnions a fixed distance away from trolley chain and beam, preventing buckets from swinging loosely against chain



Second bracket brace allows buckets to rotate around trunnions, remaining upright at all times

. . . You enjoy many money-saving features when you demand . . .

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CASTERS & WHEELS

RUBBER TREADS . . . a wide choice of treads suited to all types of floors, including Darnellopreno oil, water and chemical-resistant treads, make Darnell Casters and Wheels highly adapted to rough usage.

RUST-PROOFED . . . by the Udylite process, Darnell Casters give longer, care-free life wherever water, steam and corroding chemicals are freely used.

STRING GUARDS . . . Even though string and ravelings may wind around the hub, these string guards insure easy rolling at all times.

LUBRICATION . . . all swivel and wheel bearings are factory packed with a high quality grease that "stands up" under attack by heat and water. Zerk fittings are provided for quick grease-gun lubrication.

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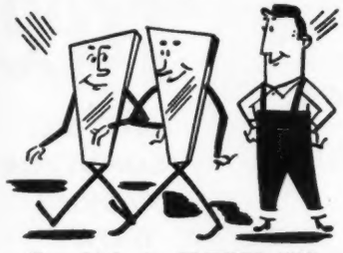
When inquiring check CP 4126 on handy form, pgs. 2-3

The case of the struggling steel chips...

A Cleveland concern had a really perplexing problem of congested bins. No matter how the steel chips struggled to get through, the result was either a trickle or a complete jam-up.

As luck would have it, one of our men happened along and suggested a CLEVELAND vibrator be installed on the sloping side of the bin. It worked like a charm, and the steel chips struggled no more.



Ever think of a CLEVELAND vibrator for your stubborn materials? Our detailed literature will tell you more about it.

AIR *and* ELECTRIC

Bin Stuck Lately?

THE CLEVELAND VIBRATOR COMPANY

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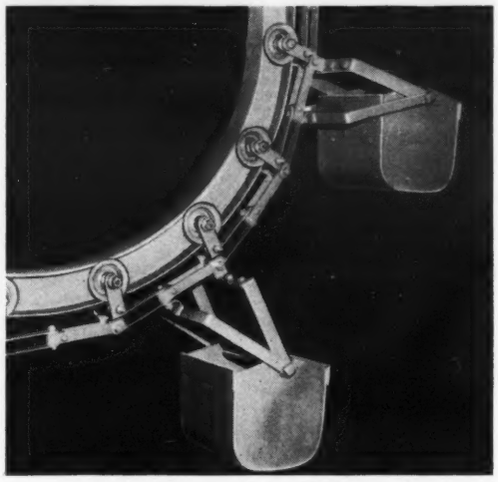
When inquiring check CP 4127 on handy form, pgs. 2-3

and spilling their contents on vertical or inverted runs. Instead, buckets rotate around their trunnions to remain upright at all times until they reach tipping rollers at discharge points.

Bucket hanger design permits multiple-plane path with single conveyor, eliminating need for numerous transfer points. Tipping rollers for emptying buckets may be located in a fixed position or may be manually or electronically controlled to permit unloading at several discharge points. For conveying many parts or finished goods, wire baskets or pallets can be substituted for buckets. Unit can also be installed in inverted position if desired. Where desired, conveyor can be loaded in both directions — as carrying coal from silo to stoker and returning with boiler ashes.



Single conveyor travels multi-plane path

(Multiplane Trolley Conveyor with Stif-Arm Hangers is a product of Hapman Conveyors, Inc., Div. of Hapman-Dutton Co., Dept. CP, 630 Gibson St., Kalamazoo, Mich. . . . or for more information check CP 4128, pages 2 and 3.)

Explains services for users of storage batteries

Illustrated four-page bulletin explains to potential user of manufacturer's batteries what he may expect in the way of periodic inspections, battery shop personnel training, inspection reports and recommendations from the manufacturer.

"Engineering Services" bulletin is issued by Edison Storage Battery, Div. of Thomas A. Edison, Inc., Dept. CP, 51 Lakeside Ave., West Orange, N. J. When inquiring specify CP 4129 on handy form, pages 2 and 3.

Make sure your maintenance man sees this!

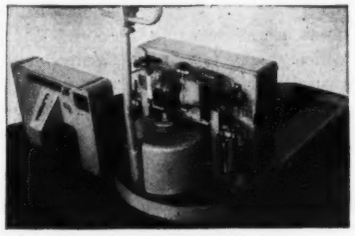
Clark's

POWRWORKER "26"*

The most "Serviceable" truck ever built!

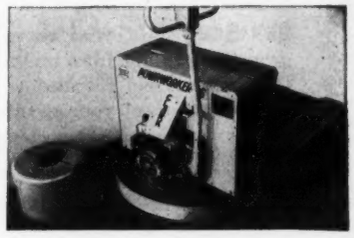
***POWRWORKER* "26" Pallet Truck**
4000 and 6000 lbs. capacity
Also available as platform or tilting fork stacker

Ask him to compare these ACCESSIBILITY features!



1 HYDRAULIC SYSTEM EXPOSED IN 2 MINUTES . . .

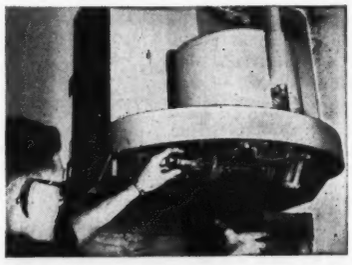
Remove 4 bolts and slip off the one-piece cover; the complete hydraulic sub-assembly is exposed. Hydraulic motor, pump, oil reservoir, valve assembly and self-aligning cylinders are immediately accessible and ample space is provided for quick inspection or removal.



2 POWER HEAD READY-TO-WORK-ON IN 2 MINUTES . . .

Split cover allows complete accessibility to the drive motor, brakes, resistor and control panel by merely removing 7 screws. Revolving head permits servicing any side of the power head without further dis-assembly. For major overhaul, the whole unit can be removed in 17 minutes.

***The POWRWORKER* "26" is only 26 inches longer than the load . . the shortest standard truck on the market!**



3 CHANGE DRIVE TIRE IN 12 MINUTES . . .

Standard Press-on type demountable tire is furnished as original equipment. Raise the truck 12 inches and loosen spanner nut which releases the axle shaft and the wheel drops out. Split wheel rim with spreader inserts allow immediate tire dis-assembly and re-assembly.

CLARK EQUIPMENT POWRWORKER SECTION
Industrial Truck Division
CLARK EQUIPMENT COMPANY
Battle Creek 9, Michigan

☐ Please send POWRWORKER literature.
☐ Have representative call.

Name_____

Firm Name_____

Street_____

City_____ Zone____ State_____

When inquiring check CP 4130 on handy form, pgs. 2-3

HERE'S WHY LEADING MANUFACTURERS SPECIFY CAMBRIDGE INDUSTRIAL WIRE CLOTH

IN BULK

20 x 250 mesh up to 4" openings — any metal or alloy

QUALITY—accurate mesh count and uniform mesh size are assured because we assign individual operators to each of our looms during weaving . . . careful inspection just before shipment eliminates defective material.

DELIVERY—you can get immediate delivery on the most frequently used types of cloth because we keep them in stock in our warehouse. If the type you need is not in stock, we'll schedule our looms to get your material to you without delay.

SERVICE—your order, no matter how small or large, receives prompt handling from our home office staff. Of course, your Cambridge Field Engineer is fully qualified to help you select the cloth to meet your specific needs.

OR FABRICATED PARTS

We're fully equipped to fabricate wire cloth parts of any type . . . filter leaves, strainers, sizing screens, etc. Single or quantity orders receive the same careful attention. We'll work from your prints or draw up prints for your OK.

LET US QUOTE on your next order for wire cloth, in bulk or as specially fabricated parts. Write direct or look under "Wire Cloth" in your classified 'phone book for the Cambridge man nearest you. And, if you buy Wire Cloth regularly, we'll be glad to send you our list of material available in warehouse stocks.

FREE CATALOG gives full range of wire cloth available from Cambridge. Includes fabrication facilities and useful metallurgical data. Write for your copy today.

The Cambridge Wire Cloth Co.

WIRE CLOTH | METAL CONVEYOR BELTS | SPECIAL METAL FABRICATIONS

Department F
Cambridge 12, Maryland

OFFICES IN LEADING INDUSTRIAL AREAS

When inquiring check CP 4131 on handy form, pgs. 2-3

Gives automatic count of cartons passing over conveyor . . .

unit counts up to 99,999 items, then starts over

Case counter provides accurate, automatic check of exact number of cartons or packages that pass over section of gravity wheel conveyor. When an item depresses free-wheeling rollers on counter arms, unit is actuated by one digit.

Unit counts up to 99,999 and then starts over. Knurled knob is provided for resetting. Unit may be easily installed on manufacturer's conveyors.

(Case counter is a product of Rapids-Standard Co., Inc., Dept. CP, 342 Rapistan Bldg, Grand Rapids 2, Mich. . . . or for more information check CP 4132 on handy form, pages 2 and 3.)

Gear-head motors drive power units for conveyors

Combination center drive and take-up unit is powered by ½ to 1 hp gear-head motors. Unit is made in widths from 12 to 24" in 2-inch increments. Wider widths can be obtained on special order. Motors have maximum effective pull of 300 lb. Combination unit uses regular 3-ply belting.

(Conveyor drive and take-up unit is a product of Lamson Corp., Dept. CP, 303 Lamson St., Syracuse, N. Y. . . . or for more information check CP 4133 on handy form, pages 2 and 3.)

There's a BETTER WAY...

. . . than either pounding or profanity to keep bulk materials flowing from bins and hoppers. Clogged bins cause serious production bottlenecks. Don't lose time, money and patience when you can . . .

Make bins behave with SPO VIBRATORS!

A complete range of types and sizes is available to handle every vibration requirement. For complete details . . .

WRITE FOR CATALOG 50

5069-SI

SPO INCORPORATED

6531 GRAND DIVISION AVE. • CLEVELAND 25, OHIO

When inquiring check CP 4134 on handy form, pgs. 2-3

Free

NEW BELT CONVEYOR CARRIER DATA

Full information on new low-priced 745 series belt conveyor carriers now available for immediate delivery from stock. New carrier simplifies ordering and stocking for many applications. Bulletin No. 554 tells how to order and install—describes design features usually found only in higher priced carriers. Mail coupon for your copy today.

745 Carriers are available from stock for 18", 24", 30" and 36" conveyor belts.

STEPHENS-ADAMSON MFG. CO.
Standard Products Division
11 Ridgeway Ave., Aurora, Ill.
Please send me Bulletin 554 on 745 Carriers
Name.....
Company.....
Address.....
City..... Zone..... State.....

When inquiring check CP 4135 on handy form, pgs. 2-3

Scoops granular material into containers

Uses: For dispensing powders, crystalline and granular materials into containers.

Features: Scoop can be quickly disassembled for cleaning, or it can be sterilized as unit in autoclave.

Description: Adjustable scoop is constructed of aluminum alloy with chrome plated brass fittings. It is available in sizes to

dispense from 0.20 to 100 cc per fill. Each size has an adjustment range of approximately 1 to 10.

Volume is set by means of movable divider. Once correct position is determined, divider is locked into position with thumb nut. Material to be dispensed is scooped up and leveling lever depressed with thumb.

(Scoop is a product of the National Instrument Co., Dept. CP, 50-05 Queensbury Ave., Baltimore 15, Maryland . . . or for more information check CP 4136 on handy form, pages 2 and 3.)

Illustrates and explains pneumatic conveyors

Applications and advantages of manufacturer's pneumatic conveying systems are presented in four-page, illustrated bulletin.

Bul TV-553 is issued by The Young Machinery Co., Dept. CP, Muncy, Pa. When inquiring specify CP 4137 on handy Reader Service slip located between pages 2 and 3.

For more information on product at right, specify CP 4138 . . . see information request blank between pages 2 - 3.

Why the ALLIS-CHALMERS 2-yd HD-9G is a

Bigger Value for Bigger Jobs

If your production demands are large enough to keep an Allis-Chalmers HD-9G Tractor Shovel busy, you will find it is your top value in terms of work capacity per dollar invested. Actual tests by users show that in many cases this 2-yd tractor shovel will do up to three times as much work as a 1-yd machine. For example, the Doetsch Brothers, Evanston, Illinois, contractors, found that their HD-9G could fill a 10-yd truck in two minutes while it took their 1-yd machine five minutes to do the same job.

In addition to large bucket capacity, the HD-9G has the power, traction and reach to handle jobs that smaller machines could not do. Its 72 drawbar hp, 29,900-lb weight and 11-ft, 9-in. dumping height mean big work capacity from every angle.

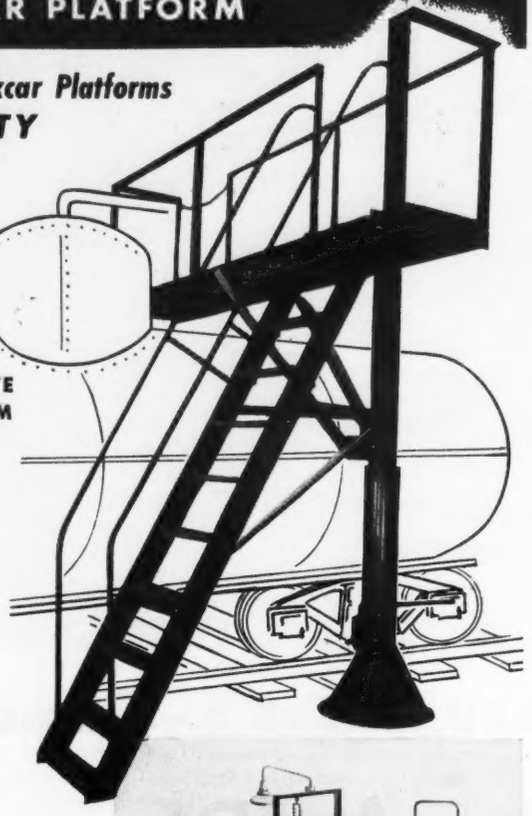
Just as important as its work ability is its "keep working" ability. Full-length box-A main frame relieves all working stress on engine, clutches and transmission. Truck wheels, idlers and support rollers require lubrication only once every 1,000 hours. Crawler tracks stand up in cullet and other sharp, abrasive material as only steel can.

Write for literature or ask your Allis-Chalmers dealer to show you the HD-9G in action.

ALLIS-CHALMERS
TRACTOR DIVISION · MILWAUKEE

NEW! LOW PRICED MODEL OF FAMOUS NICHOLS SAFETY TANK CAR PLATFORM

All Nichols Tankcar Platforms Feature SAFETY



NEW INEXPENSIVE ACCESS PLATFORM

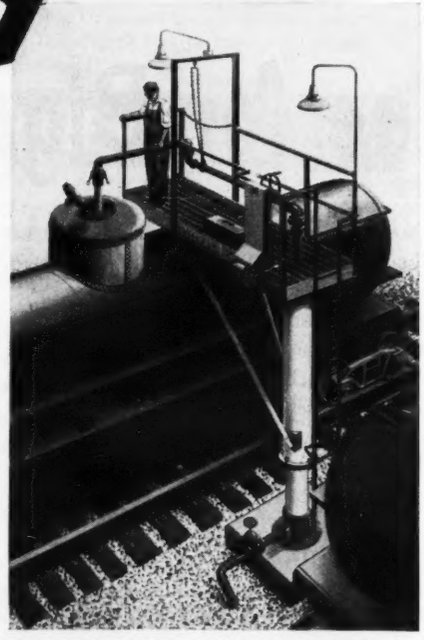
Swings horizontally—always level, stable. Lightweight. Raises and lowers by hand operated hydraulic mechanism—usable on all sizes of tank cars. Stairway or ladder arrangement optional. Piping not furnished. Model NECO-3NT.

SAFETY TANK CAR PLATFORM

Incorporates within its structure one or more pipes and their accessories. Powered by hand wheel on operating deck. Remains at fixed elevation—turns 360 degrees. Comes equipped with access ladder. Lighting system optional. Model NECO-2A.

Multi-Pipe and Retractable Operators Platform Type also available.

Write today for information how Nichols Safety Platforms can handle your fuels, chemicals, foods and other liquids.



NICHOLS ENGINEERING CO.

3816 W. GRAND AVE., CHICAGO 51, ILLINOIS

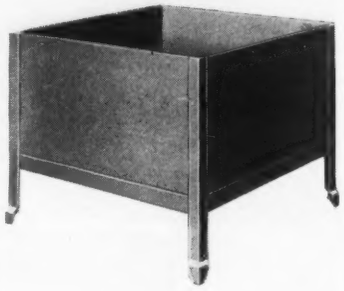
SERVING INDUSTRY SINCE 1894

When inquiring check CP 4139 on handy form, pgs. 2-3

MATERIAL HANDLING

Pallet box is designed for stacking

Special feet welded into legs of pallet box allow it to stack on itself. It is constructed of 3/16" steel on



sides and bottom and 2 x 2 x 1/4" angles for corners and legs. It can be made in any size required. Height of bin and floor-clearance are variable.

(Box is the product of Factory Service Co., Dept. CP, 4615 N. Twenty-first St., Milwaukee 9, Wis. . . . or for more information check CP 4140, pages 2 and 3.)

Tank trailer repair manual is aid to transporters

Combination manual and handbook gives data on the repair of tanks and information concerning handling of various tank cargoes. Among the many cargoes discussed are flammable liquids, acids and other corrosive liquids, compressed gases, poisonous materials and explosives. Materials to be used in each case are defined with dimensions and procedures in handling as well as testing and repair. There are sections on cleaning, testing and safety instructions; operation of explosimeter; tank design and repair procedures; and regulations of the Interstate Commerce Commission. The 31-page book is illustrated.

Tank Trailer Repair Manual is available from the Fruehauf Trailer Co., Dept. CP, 10940 Harper Ave., Detroit 32, Mich. When inquiring specify CP 4141 on handy form, pages 2 and 3.

MAKE

You can ~~save~~ money and time with MARMAN Band Clamps

SERIES NO.	360	365	450	455
MIN. WIDTH	5/8	5/8	3/4	3/4
BAND GAGE	.020	.020	.025	.025
BOLT SIZE	10-32NF-2 x 1¾	10-32NF-2 x 2¼	¼-28NF-2 x 2½	¼-28NF-2 x 3½
MIN. DIA.	2	3	4	7

Quick-Coupler Clamp...a Marman design for instant removal and installation...Stainless Steel... tough, corrosion resistant, vibration proof.

There is a Marman design for every clamping operation. Order quick-coupler clamp direct from this advertisement. Write, wire or phone for catalog or engineering assistance. **CP-1254**

7-434

MARMAN PRODUCTS CO., Inc.
11214 EXPOSITION BLVD.
LOS ANGELES 64, CALIF.

When inquiring check CP 4142 on handy form, pgs. 2-3

alphabetical index on page 199

. . . for alphabetical index of all processes, materials, services, and equipment discussed in this issue's editorial columns and advertisements, turn to page 199. "Quick-locator" starting on that page was a feature in CHEMICAL PROCESSING years ago.
It means extra work for the Editors, but it helps you, the reader, in finding what you want . . . in a hurry!

Fragile cartons moved, stacked easily without damage . . .

regulated pressure of hydraulic clamp makes variety of loading jobs possible

Uses: Handling and stacking of bulky, but fragile cartons.

Features: Accurately regulated pressure is controlled by operator. Hydraulic clamps are equipped with rubber facings to assure firm grip on fragile cartons.

Description: Clamps are attached to manufacturer's fork lift truck, have self-equalizing and

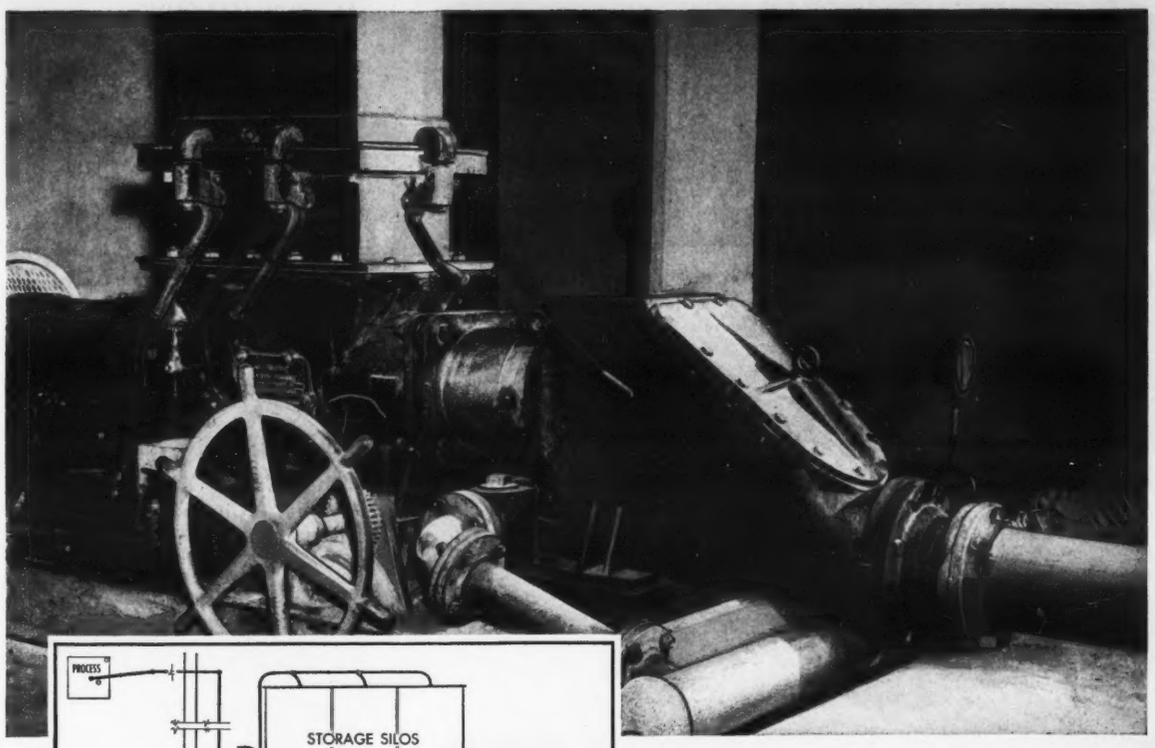
Clamps handle fragile cartons easily, safely

articulating features which automatically align pads to sides of load. This corrects any poor stacking of loads prior to lift.

(Hydraulic clamp is a product of Yale & Towne Mfg. Co., Dept. CP, 11000 Roosevelt Blvd., Philadelphia, Pa. . . . or for more information reader may simply check CP 4143 on handy form, pages 2 and 3.)

Does your plant need modern material handling methods . . . ?

check the handy Product Directory (pages 199 to 201) for a quick reference to ideas and equipment in this issue.



Fuller-Kinyon Pump *does double duty!*

Not only does this Fuller-Kinyon Pump unload pulverized phosphate rock from either box or hopper-bottom cars, but it serves a double duty . . . it can be readily moved, on a narrow-gage track, to positions underneath any one of three silos for conveying to three widely separated process points in the plant. Connection to the silo to be emptied is easily and quickly made with quick-detachable clamps. By use of a diverting valve in the conveying line, it is possible to convey directly from car to process points if desired, by-passing the storage silos.

Years of experience and advanced engineering design by Fuller enabled the purchaser to not only reduce their initial investment by the use of one Pump for this dual purpose, but it also gives them a clean, safe, and efficient conveying system, one that will operate, day in and day out, at the lowest possible cost per ton of material handled.

Conveying capacity is rated at 50 tons an hour, with the longest single conveying distance approximately 690 feet; together with branch lines makes a total of about 1070 feet. Air for conveying is furnished by a Fuller Rotary Single-stage Compressor, piped direct to the Pump . . . air where and when needed, at the proper pressure to do the work most economically and efficiently.

If you handle dry, pulverized materials in bulk it will be worth your while to learn about Fuller air-conveying systems. Write us today.

Fuller
CONVEYS BY AIR
CLEAN . . . SAFE . . . EFFICIENT

FULLER COMPANY, Catasauqua, Penna.

Branch Offices

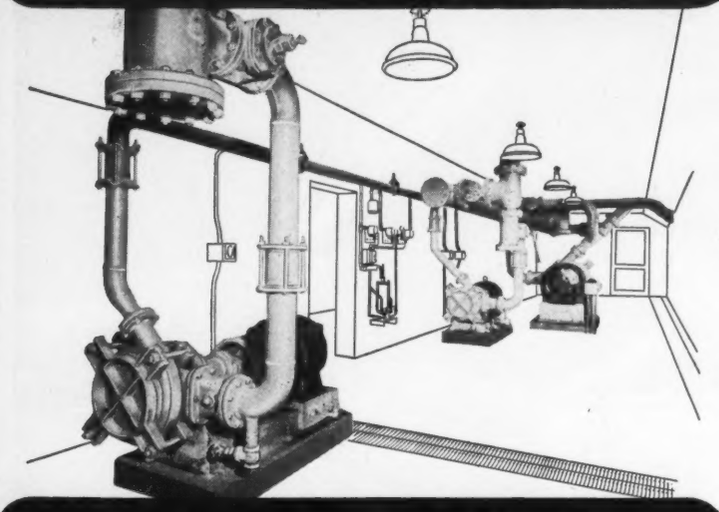
Chicago • San Francisco • Los Angeles • Seattle • Birmingham

P-153
9685

DRY MATERIAL CONVEYING SYSTEMS AND COOLERS . . . . PREHEATERS . . . . COMPRESSORS AND VACUUM PUMPS . . . . FEEDERS

When inquiring check CP 4144 on handy form, pgs. 2-3

Handles extremely thick slurries with high specific gravities



MORRIS Type R SLURRY PUMP

Heavy viscous slurries with solids ratios as high as 70% by weight are not unusual loads for a Morris Type R Slurry Pump.

A case in point is this Morris installation at the Missouri Portland Cement Co., St. Louis, Mo. The two Morris 3R Pumps in the foreground each handle 200 GPM of a cement slurry at 64% solids with 1.66 specific gravity. Speed is 1180 RPM. The 6R Pump in the background handles 600 GPM of the same slurry at 880 RPM.

Long operating life... little or no maintenance

Massive running parts of the Type R compensate for the increased load imposed by high specific gravities. Hydraulic passages are deliberately designed for high concentrations of solids—the result of careful study of wear patterns shown by pumps in the field handling all kinds of abrasive materials. Elimination of areas of throttling and turbulence assures uniform wear of all parts.

There are no internal studs or bolts—no troublesome internal joints and fits. The suction disc liner is merely *clamped* into position between disc and shell. The absence of high stress on the shell permits wide variations in its composition—including materials of high abrasive resistance—to resist wear and extend the operating life of the pump.

Let our engineers consult with you on your slurry pump problems. They'll give you the benefit of 88 years of pump-building experience. Or, write for Bulletin 181.

MORRIS MACHINE WORKS
Baldwinsville, New York
Sales Offices in Principal Cities

MORRIS *Centrifugal Pumps*

When inquiring check CP 4145 on handy form, pgs. 2-3

MATERIAL HANDLING

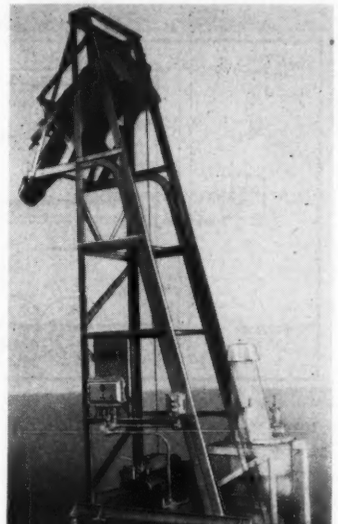
Upends and empties drums into high-walled vats

Uses: For mechanically emptying drums or barrels into vats or other high-walled vessels.

Features: Semi-automatic dumper avoids manual lifting, speeds drum dumping, and provides dust-free emptying.

Description: Drum is clamped to "gig" of dumper which rises above vessel, upends and empties drum and returns for new load.

Frame is of steel and mounted on casters. Gig rides on rollers and is elevated and lowered by cable.



Empties drum into high-walled vessels

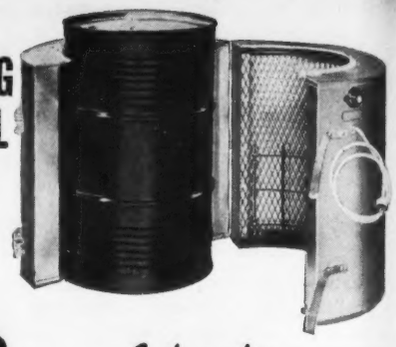
Dust control spout guides drum contents into receiving receptacle. Entire operation is controlled by one man at push-button panel.

Dumper is available to accommodate any size drum and to discharge at any height up to 12½ ft.

Stationary models are available for greater heights.

(Dumper is a product of the Gifford-Wood Co., Dept. CP, Hudson, N. Y. . . . or for more information reader may simply check CP 4146 on the convenient Reader Service slip between pages 2 and 3.)

WARMS ANYTHING IN METAL DRUMS UP TO 450°F



Palmer *Automatic* DRUM WARMER

A PORTABLE ELECTRIC OVEN in two models for 55 or for 30 gallon steel drums.

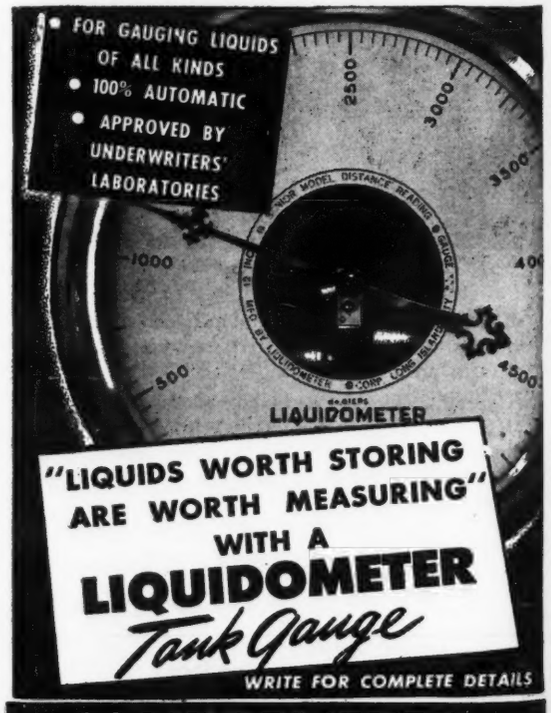
Saves Time—Saves Money. Makes removal from drum by dipping, pouring or pumping, easy and convenient, for any viscous material that handles better when warm.

Operates automatically and economically. Two hinged halves, well insulated, fit around drum at point of use—eliminates handling hot drums. Supplied for 115, 208, 230 or 460 volts, single, or three phase. Catalogue, prices and specifications on request. Write today!

HAROLD L. Palmer COMPANY

2980 West Davison Ave., Detroit 38, Michigan, Phone TUlsa 3-1100

When inquiring check CP 4147 on handy form, pgs. 2-3


• FOR GAUGING LIQUIDS OF ALL KINDS
• 100% AUTOMATIC
• APPROVED BY UNDERWRITERS' LABORATORIES
LIQUIDOMETER
"LIQUIDS WORTH STORING ARE WORTH MEASURING" WITH A LIQUIDOMETER Tank Gauge
WRITE FOR COMPLETE DETAILS
THE LIQUIDOMETER CORP
38-18 SKILLMAN AVE., LONG ISLAND CITY, N.Y.

When inquiring check CP 4148 on handy form, pgs. 2-3

Filled multiwall sacks flattened into space-saving packages

Uses: For kneading and flattening of filled multiwall sacks.

Features: Feed and discharge heights can be adjusted separately over wide range to match pitch of conveyor lines leading to and away.

Description: Bag flattener consists of two roller-bed conveyors, one mounted above the other with surfaces facing. Top unit is spring-loaded, and is adjustable up and down to provide proper pressure on sacks. In operation, bags from filler or storage pass between two belts and are kneaded and compressed by action of rollers into compact, flat packages of uniform size and shape.

Compresses materials for improved handling

Flattener is manufactured in 3 standard lengths and 3 belt widths. Upper and lower belts are powered with separate motors, both totally enclosed for protection. Explosion-proof and open ventilated motors are also available.

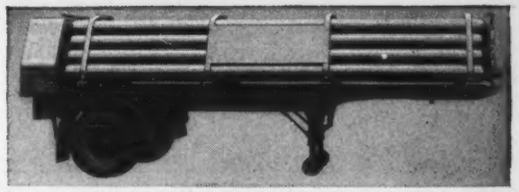
(BF Bag Flattener is a product of the Rapids-Standard Co., Inc., Dept. CP, 342 Rapistan Bldg., Grand Rapids 2, Mich. . . . or for more information check CP 4149 on handy form, pages 2 and 3.)

Folder shows attachments for lift trucks

Illustrated eight-page folder (11 x 15½") shows hydraulic clamps, side shifter-loader, crate clamps, bale clamps, and other fork lift attachments.

Vol. 12 No. 3 issue of "Handling Materials Illustrated" is issued by Towmotor Corp., Dept. CP, 1226 E. 152nd St., Cleveland 10, Ohio. When inquiring specify CP 4150, pages 2 and 3.

NEW hydrogen transport solves refiners' storage problems



Semi-trailer with 30 or 38 tubes is delivered to point of usage. Capacity of 30 tube unit is 39,000 cu. ft. at 2400 psi; of 38 tube unit, 50,000 cu. ft. at 2400 psi.

Taylor-Wharton can also furnish individual storage cylinders, made to ICC 3A2400 classification and qualifying under API-ASME for 1450 psi.

Taylor-Wharton high pressure transports efficiently store and deliver for Allied Chemical & Dye Corporation. High storage capacity and mobility will save handling dollars and floor storage space for you too.

Semi-trailer Mounts 30 or 38 Tubes for Mobile, Compact, High Pressure Hydrogen Storage

In response to hydrogen storage problems faced by new platforming process plants, Taylor-Wharton offers two kinds of high pressure cylinder installations, the permanent and the transport, now successfully used in the chemical industry.

Investigation of high pressure equipment will reveal the economy of this method of storage. (Low pressure storage requires an expensive compressor.) The tubes readily provide a flexible supply of hydrogen to get you "on stream" quickly. High pressure storage saves space, packing up to 50,000 cubic feet of hydrogen at 2400 psi in the transport.

Write now for Bulletin 200 which will show you the economy of Taylor-Wharton cylinders for your hydrogen plant.

Modern heat treating facilities for tubes at Taylor-Wharton Iron and Steel Company.

ESTABLISHED IN 1742

TAYLOR-WHARTON IRON & STEEL COMPANY

CINCINNATI 12, OHIO

Also Manufacturers of: Manganese Steel Castings, Alloy and Carbon Steel Castings, Special Trackwork, Gas Cylinders

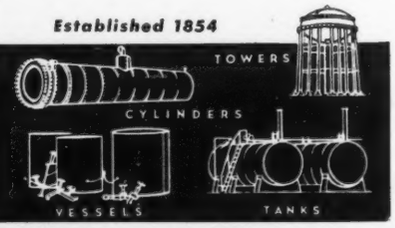
When inquiring check CP 4151 on handy form, pgs. 2-3

THE FIRST HUNDRED YEARS

FROM a small iron-works in 1854, we have been fortunate in growing to be one of America's largest metal fabricating industries . . . For the privilege of celebrating our Centennial, we express our appreciation for the friendship of four generations of customers, and the loyalty of four generations of workers.

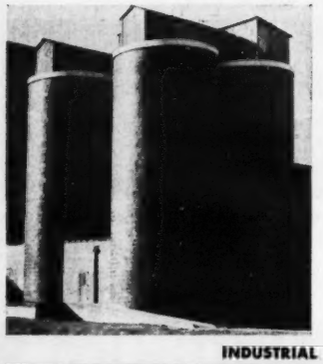
R.D. COLE
MANUFACTURING CO.
NEWNAN, GA.

Established 1854



When inquiring check CP 4152 on handy form, pgs. 2-3

SEE HOW YOU'LL SAVE BY STORING BULK MATERIALS THIS MODERN WAY



Get your copy of Kalamazoo Bulletin 1153-B. Write today.

INDUSTRIAL STORAGE BIN DIVISION

Kalamazoo TANK and SILO COMPANY

1245 HARRISON STREET • KALAMAZOO, MICHIGAN

When inquiring check CP 4153 on handy form, pgs. 2-3

MATERIAL HANDLING

Maneuverable conveyor moves material in tight spots . . .

wheel assembly can be removed for small openings

Uses: For hauling wet concrete, stone, brick, sand, flue dust, cinders, refuse, etc. Can also be used in clearing out checker chambers and scale piles.

Features: Wheels are located at balance point for easy maneuverability. If necessary, the whole wheel assembly comes off quickly and easily.

Description: Conveyor is built entirely of extruded aluminum and is powered by electric, gas or air motor. It has clearout and scooper at head and tail ends, and sealed-in anti-friction bearings throughout.

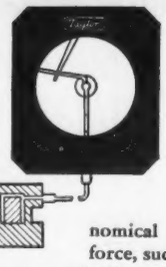
Sizes available are 12, 16, and 20 ft in length with 16″ widths on all models. Weight ranges from 336 lb for the 12′ model (without power) to 406 lb for the 20′ model. Belt speed is 175 fpm. Power is supplied by 2½ hp air or 1 hp electric motor. Wheels are 2.75 x 10 pneumatic.

(Model SM is available from Farnco Sales Co., Dept. CP, P. O. Box 5796, Pittsburgh 8, Pa. . . . or for more information check CP 4154 on handy form, pages 2 and 3.)

Lead-acid storage battery maintenance explained

Technical training manual on lead-acid storage battery maintenance contains 44 pages with 64 photographs, diagrams, and tables. Booklet has been designed to enable users of battery-powered industrial trucks to organize battery maintenance training programs in their own plants.

"Training Manual" bulletin is issued by Gould-National Batteries, Inc., Dept. CP, Stone & Calhoun Sts., Trenton 7, N. J. When inquiring specify CP 4155 on handy form, pages 2 and 3.



Tricky load measurement problems?

Taylor Volumetric Load Measuring Elements provide a simple, economical means of directly measuring load or force, such as the tension on a conveyor belt, the thrust on a bearing, "nip" pressure on processing rolls, or the weight of solids or corrosive liquids in a tank for example.

There are four different types of rugged, self-contained units, to fit all requirements. The measurement is read directly on the chart or scale of a recording or indicating instrument.

Illustrated above is the Spool Type Element, designed for measuring either tension or compression loads or a combination of both. The range limit for compression loads is 0-240,000 lbs., maximum load not to exceed 400,000 lbs. Tension loads can be measured from 0-30,000 lbs.

For full details call your Taylor Field Engineer, or write for **Bulletin 98232.** Taylor Instrument Companies, Rochester, N. Y., or Toronto, Canada.

Taylor Instruments
MEAN ACCURACY FIRST

When inquiring check CP 4156 on handy form, pgs. 2-3

First and Foremost in the **FLOATLESS CONTROL FIELD**

B/W **Floatless**

LIQUID LEVEL and INDUSTRIAL CONTROLS

—Write for Catalog—

B/W CONTROLLER CORPORATION

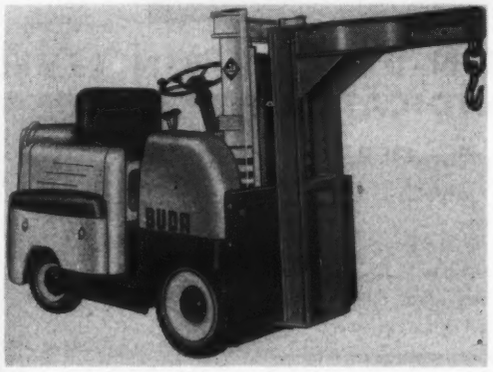
2204 East Maple Road, Birmingham, Michigan

FIRST IN THE FLOATLESS CONTROL FIELD

When inquiring check CP 4157 on handy form, pgs. 2-3

Easily attached crane arm handles truck loads unsuited for forks

Crane arm for fork lift trucks is designed for handling loads where forks or clamps are not applicable. Unit is easily attached to carriage and standard fork bar on manufacturer's trucks. Arms are constructed



Crane arm provides for adjustable load center

of reinforced channel steel and are available in 24, 36, 48, 60 and 72″ lengths. Three adjustments on arm provide for adjustable load center. When used with manufacturer's largest truck designed for crane arm, 24″ arm has capacity of 6494 lb.

(Crane arms are a product of Buda Co., Div. of Allis-Chalmers Manufacturing Co., Dept. CP, Harvey, Ill. . . . or check CP 4158, pages 2 and 3.)

Have You Wondered Why —

a manufacturer's name and address appear at the end of many articles . . . ?

The "source" of editorials, which we indicate by publishing a company name and address at the end of many articles, is not "advertising" for the manufacturer. It's put there as an editorial service to help you get more information on processes, materials, ideas, and equipment which interests you. It also helps us to decide, from your response, which subjects you want most in CHEMICAL PROCESSING. Our handy Reader Service slip, located between pages 2 and 3, helps you to get the details you want in a hurry . . . helps us get the best stories in lining up future issues.

THE EDITORS

TOP: Model HAH "PAYLOADER" dumping its load of material into a conveyor.
BOTTOM: The same unit with Crane Hook carries barrels of metal pieces through doorways and

Making DOLLARS
in small quarters . . .

Here's how to move materials profitably in cramped quarters. This Model HAH "PAYLOADER" tractor-shovel scoops up more than a ton of bulk materials at a time, carries it swiftly over smooth or rough ground and can dump it over bin or truck sides 8 feet high. Quickly-installed attachments like fork lift and crane hook also enable it to do many other material-handling jobs.

Short wheel base and rear-wheel power steer are what make it so maneuverable. Three-speed full-reversing transmission and torque converter drive insure precise, simple control and fast, profitable operation.

This "PAYLOADER" is one of a complete line of seven tractor-shovels with bucket capacities from 12 cu. ft. to 2 cu. yd. including rear-wheel and front-wheel drive models and big, powerful 4-wheel-drive types.

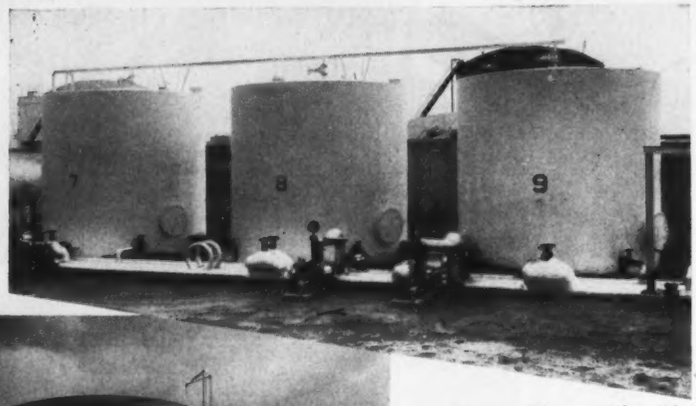
Every "PAYLOADER" is a proven machine with thousands in service — built by Hough, the pioneer and leader in tractor-shovel development — sold and serviced by 160 outstanding Distributors throughout the U.S.A. and Canada. Find out what a "PAYLOADER" can do for you. Your Distributor will be glad to demonstrate. The Frank G. Hough Co., 744 Sunnyside Ave., Libertyville, Ill.

JOB STUDIES
Are available with detailed performance of "PAYLOADER" tractor-shovels in a variety of industries. Write for copies — no obligation.

PAYLOADER®
THE FRANK G. HOUGH CO. · LIBERTYVILLE, ILL.
SUBSIDIARY—INTERNATIONAL HARVESTER COMPANY

When inquiring check CP 4159 on handy form. pgs. 2-3

Tanks to Suit Your Purpose



Above: Three 12-ft. 6-in. diam. by 12-ft. cone roof tanks located at the Atlas Processing Company plant in Shreveport, Louisiana.

Left: Two 30-ft. diam. by 40-ft. tanks equipped with Horton Double-Deck Floating Roofs at the Atlas Processing Company plant.

... by CB&I

Cone roof tanks, tanks equipped with Horton® Floating Roofs, corrosion-resistant tanks either solid, clad or lined, elevated tanks, Hortonspheres® for anhydrous ammonia storage, special steel plate work . . . a complete variety of tanks to serve the chemical industry . . . all built by CB&I.

Chicago Bridge & Iron Company has complete facilities at all four plants to engineer, fabricate and erect the type of welded steel plate structures that are needed to suit *your* purpose. There is equipment for stress relieving and X-raying to code requirements and for pickling and painting fabricated steel shapes and forms. When planning welded steel plate structures of any sort be sure to write our nearest office for information, estimates or quotations. CB&I engineers will be happy to assist you in any way.

CHICAGO BRIDGE & IRON COMPANY

Atlanta 3 ..... 2107 Healey Bldg.
Birmingham 1 ... 1533 North Fiftieth St.
Boston 10 .... 1007-201 Devonshire St.
Chicago 4 ..... 2116 McCormick Bldg.
Cleveland 15 ..... 2212 Midland Bldg.
Detroit 26 ..... 1535 Lafayette Bldg.
Havana ..... 402 Abreu Bldg.
Houston 2 ..... 2151 C & I Life Bldg.
Los Angeles 17 . 1536 General Petroleum Bldg.
New York 6 ... 3314—165 Broadway Bldg.
Philadelphia 3 . 1650—1700 Walnut St., Bldg.
Pittsburgh 19 ..... 3208 Alcoa Bldg.
Salt Lake City 4 .... 507 West 17th South St.
San Francisco 4 ..... 1545—200 Bush St.
Seattle 1 ..... 1307 Henry Bldg.
Tulsa 3 ..... 1649 Hunt Bldg.

Plants at BIRMINGHAM, CHICAGO, SALT LAKE CITY, and GREENVILLE, PA.

When inquiring check CP 4160 on handy form, pgs. 2-3

MATERIAL HANDLING

Fills need for box to cart large quantities of small parts . . .

boxes stack easily, saving valuable storage space

Uses: For materials handling applications where there is no need to manually lift a filled box and where large quantities of small parts must be moved.

Features: Since they stack in rigid fashion, boxes can be utilized as small parts storage bins. Contents always remain visible and accessible.

Description: Steel box is 36" long, 14" high, and 16½" wide. It is all-welded 14-gage construction and standard weight permits batch weighing of small parts for simplified inventory control.

Units can be used in conjunction with powered belt, overhead, wheel and roller conveyors. From one to three boxes can be conveniently carried between forks of lift truck.

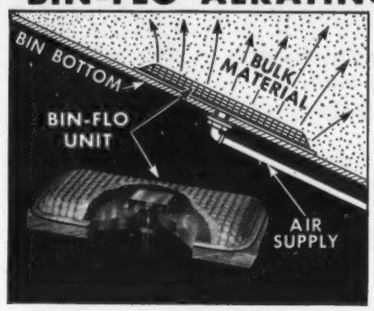
(NesTier Box 360 is manufactured by the Chas. Wm. Doepke Mfg. Co., Inc., Dept. CP, 8825 Blue Ash Rd., Rossmoyne, Ohio . . . or for more information check CP 4161 on handy form, pages two and three.)

Proper pallet construction, unit load patterns

Illustrated 20-page booklet contains sections on principles of pallet construction, specifications, how to choose and purchase correct pallets, unit load patterns, and instructions for the use, maintenance and inspection of pallets. Glossary of terms and list of government specifications are included for reference purposes.

To obtain copy of "Pallets and Palletization", remit $1.00 to National Wooden Pallet Manufacturer's Assn., Dept. CP, 215 Barr Bldg., Washington 6, D. C. When inquiring specify CP 4162 on handy form, pages 2 and 3.

BIN-FLO AERATING UNIT

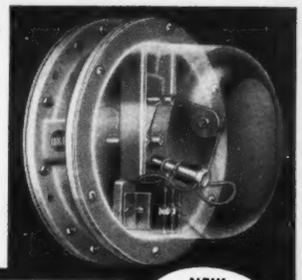


Provides Steady Flow of Dry, Finely Ground Materials which tend to bridge in storage. Uses only small amount low-pressure air.

BIN-DICATOR BIN LEVEL INDICATOR

For All Bulk Materials

signals change in level; automatically starts and stops filling and emptying equipment.



THE BIN-DICATOR CO.
13946-D Kercheval • Detroit 15, Mich.

NEW DETAIL DATA BOOK FREE

When inquiring check CP 4163 on handy form, pgs. 2-3

What's NEW IN "NATIONAL" CONVEYOR DRYERS?

NEW "P-4" CONSTRUCTION . . .

Which means a precision-built, pre-fabricated, truss-type structure, providing a new measure of strength, rigidity and durability. Advantages to the customer are obvious: Longer service life for the Dryer; smoother operation; freer access for cleaning and maintenance; and reduction of installation time in the customer's plant, as much as 50%.

NEW HOUSING PANELS . . .

Larger, stronger, more rigid, and, with their 4" insulation, providing greater protection against heat loss. Trussed-and-tensioned, non-through-metal construction.

IMPROVED AIR DISTRIBUTION . . .

Controlled to assure equal volume of air to the entire run. No "shading" — no uneven drying. Permits drying at consistently higher speeds than those previously permissible. Other features of "NATIONAL" Conveyor Dryers include continuous hopper feeds; automatic leveler to conveyor belt; pressure extraction and heating for predrying.

Write for Complete Information

Chemical Dryers of All Types and Sizes — NATIONAL — Special Drying and Heating Equipment

THE NATIONAL DRYING MACHINERY CO.

2709 N. Hancock Street, Philadelphia 33, Pa.

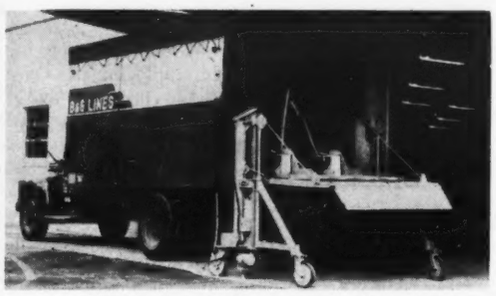
When inquiring check CP 4164 on handy form, pgs. 2-3

Powered portable loading dock raises and lowers loads from truck beds

Uses: For loading and unloading trucks from ground level inside or outside plants.

Features: Battery or AC powered hydraulic elevating mechanism raises loads to maximum height of 56".

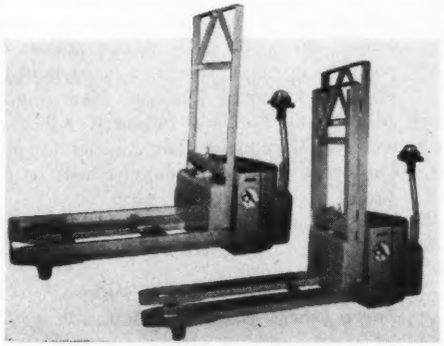
Description: Loading dock has capacity of 6000 lb. Unit can be rolled by two men to tailgate of trucks. Hand truck is placed on elevating platform and raised to level of truck bed. Unit loads are



Loading dock in place at truck tailgate

then drawn onto loading dock, lowered to floor, and transported to storage or production areas.

(Raymond Portable Loading Docks are a product of Raymond Corp., Dept. CP, 57-126 Madison St., Greene, N. Y. Check CP 4165, pages 2 and 3.)



One truck can be used for three handling operations. Pallets, as well as skids having two different underclearances, can be moved by pallet truck having double-hinged construction. Two frames, when not used to handle skids, are automatically secured in place by spring latches and are out of the way.

(Jacklift pallet truck is manufactured by Lewis-Shepard, Dept. CP, 194 Walnut St., Watertown, Mass. . . . or for more information check CP 4166 on handy form, pages 2 and 3.)

NEVER BEFORE
A CONVEYOR LIKE THIS!

Carrier Natural-Frequency Conveyors *(both horizontal and vertical)* have created the biggest stir to hit the conveying industry in a long, long time. Their advantages over conventional vibrating equipment are so great as to seem *impossible*, until you know the Natural-Frequency facts.

Carrier Natural-Frequency Conveyors substitute the natural resonant action of springs for brute force — thus UTILIZING the tremendous force of periodic vibration, which no other manufacturer had ever learned to handle! Most of the power needed to operate Carrier Natural-Frequency Conveyors is repeatedly stored up in the springs, and returned on every stroke. The result — *much less power required . . . far less maintenance . . . far less down-time!*

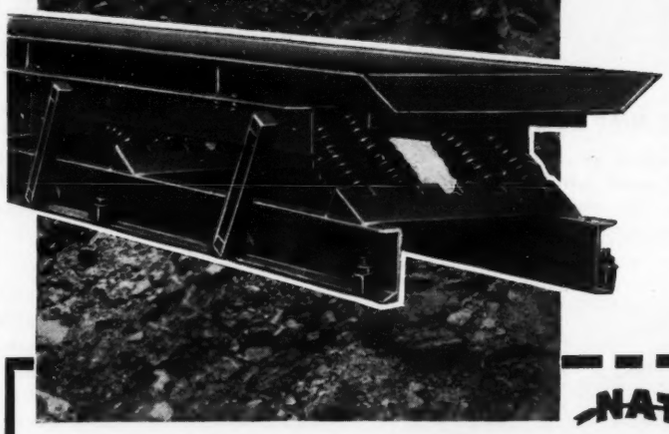
Carrier Natural-Frequency Conveyors are now moving (and processing) hard-to-handle materials for many of America's biggest industrials. Mail the coupon, *today*, for all the facts.

12,300 Foot-Tons of Hot Slag Per Hour—With 7½ H.P.!

Open-hearth slag is about as hot and abrasive as anything you can think of. It chews up conventional conveyors in "no time at all".

Moving up to 300 tons per hour of hot slag (800° to 1200°F) is routine for the 41-ft. Carrier Natural-Frequency Conveyor shown at left. There's practically no pan wear — no spillage — no maintenance!

This is just one of many unusual applications. Tell us your problem and let us see what we can work out for you. No solution, no obligation. Write!



CHECK THESE CARRIER ADVANTAGES!

HIGH CONVEYING SPEED
(Up to 100 feet per minute)

GREATER CAPACITY
(Up to 200 tons per hour)

LESS POWER REQUIRED
(About one-third as much as "competitive" equipment)

LESS MAINTENANCE & DOWN-TIME
(Less power+good design= trouble-free performance)

NO DAMPENING UNDER LOAD
(Designed with extra power for specified load, with positive stroke)

SELF-CLEANING
(Continuous, smooth trough —no pockets)

COMBINES PROCESSING WITH CONVEYING
(Can screen, dry, cool, dewater, blend, etc.)

WIDTHS FROM 6" TO 48" LENGTHS FROM 5' TO 250'
(With pans 16 ga to ½" plate, of any metal, open or enclosed)

BALANCED, VIBRATION-FREE UNITS AVAILABLE
(For use on ceilings or light floor construction)

CARRIER NATURAL-FREQUENCY CONVEYORS

Carrier Conveyor Corporation
2130 Frankfort Avenue, Louisville 6, Kentucky

Gentlemen: Without obligation, please send me Carrier Natural-Frequency Conveyor Bulletin No. 111.

Firm_____

Street_____

City_____ State_____

Att. Mr._____ Dept._____

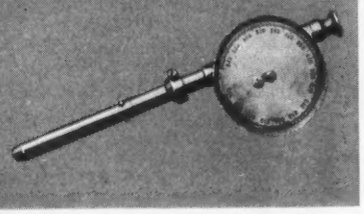
When inquiring check CP 4167 on handy form, pgs. 2-3

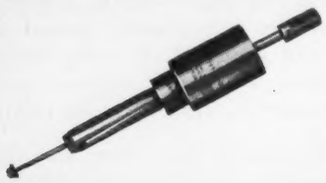
For better small tube maintenance

ELLIOTT
TUBE CLEANERS and EXPANDERS

NEW ELLIOTT TUBE GAGE

Measures inside tube diameters in .001". A quick, guide for setting tube expanders for condenser and heat exchanger tubes. Three point contact of hardened steel balls insures accurate measurements.





ELLIOTT TUBE EXPANDERS

Roll condenser and heat exchanger tubes quickly and accurately. Rotating, parallel self-feeding rolls insure good joints. For tubes ½ in. through 1½ in.

ELLIOTT CONDENSER CLEANER

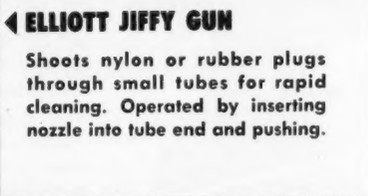
Direct-drive air-driven cleaner using shaft and drill heads. Motor supported outside the tube by overhead pipe. Also available with electric motor.

ELLIOTT JIFFY GUN

Shoots nylon or rubber plugs through small tubes for rapid cleaning. Operated by inserting nozzle into tube end and pushing.

ELLIOTT 600 Series Cleaners

For straight and curved small tubes. Air or steam driven motors. Can be equipped with expanding brushes and scraper heads.



Y4-16

Write for Descriptive Bulletin Y-38

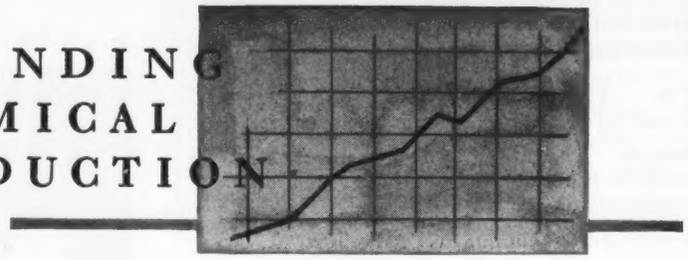
Address Elliott Company, Lagonda Division, Springfield, Ohio

ELLIOTT Company

STEAM TURBINES • MOTORS • GENERATORS • DEAERATING HEATERS • EJECTORS • CONDENSERS • CENTRIFUGAL COMPRESSORS • TURBOCHARGERS • TUBE CLEANERS • STRAINERS

When inquiring check CP 4168 on handy form, pgs. 2-3

EXPANDING CHEMICAL PRODUCTION



Mississippi Chemical ups output of anhydrous NH_3 works

Ammonia production capacity of Mississippi Chemical Corporation's plant in Yazoo City, Mississippi, will be increased from 120 tons to 290 tons per day. Increased output will be used as fertilizer, some of it distributed as anhydrous ammonia and part converted to ammonium nitrate. To increase capacity of existing plant, a second stage of carbon monoxide conversion and carbon dioxide removal, followed by single-stage low-pressure (10 psig) methanation step, is being added. Original high-pressure (1000 atmospheres) methanation step is being eliminated and methanator vessel modified to an ammonia synthesis converter.

Along with this expansion project, a fourth multitube reformer furnace is being added. Additional furnace, expected to be ready for operation in December, will boost capacity of plant to 290 tons per day and bring second purification and ammonia synthesis train up to full capacity.

Additional synthesis gas compressors are being added to plant as required for various expansion steps. The Girdler Company of Louisville, a division of National Cylinder Gas Company, is performing design, engineering and construction services for these expansions. Girdler engineered and built original plant which went on stream in 1951.

Oxo chemicals unit on stream at Texas City, Texas

Production of iso-octyl alcohol, primary decyl alcohols, and primary tridecyl alcohols is now underway at the Texas City, Texas plant of Carbide and Carbon Chemicals Company, a division of Union Carbide & Carbon Corporation. This new unit, one of the largest in the world employing the Oxo process for the synthesis of chemicals, has a rated capacity of more than 60 million pounds of chemicals per year.

Oxo process is based on the simultaneous reaction of carbon monoxide and hydrogen with an olefin. This yields an aldehyde that contains one more carbon atom than original feedstock. Operating pressures range from 1500 to 6000 psi at temperatures of approximately 200°C. Advantage of the process is that it offers a new route for the commercial production of the whole series of oxygenated chemicals in large tonnage quantities.

Polyvinyl acetate works slated for West Coast

New polymerization unit, geared for initial annual production of 3 million pounds of polyvinyl acetate emulsion, is being built by Borden's Chemical Division. Plant site is adjacent to Borden's industrial adhesives works at Dominguez, Los Angeles County, California. Polymerization unit will be on stream in early January, 1955.

Ferro starts installation of continuous smelters

At Los Angeles, installation of two modern continuous smelters for the porcelain enamel "flake" frit and glaze is now underway by the Porcelain Enamel Frit and Glaze Division of Ferro Corporation. Supplemented by two rotary-type smelters, these installations will completely modernize the Los Angeles plant. In addition to the Los Angeles operations, Ferro maintains smelting plants in Cleveland and Nashville.

Standard (Indiana) and Sinclair plan jointly-owned NH_3 plant

Standard Oil Company (Indiana) and Sinclair Refining Company have jointly announced plans for one of the Midwest's largest ammonia plants. Hammond, Indiana (near Standard's Whiting refinery and Sinclair's East Chicago refinery) has been selected as plant site. Both refineries will feed by-product hydrogen and other gases into unit. Plant will be largest in the country (300 tons/day) producing anhydrous ammonia from by-product hydrogen. Solutions of ammonia and ammonium nitrate may also be produced.

New company will be formed to own plant. Standard, which will supervise construction and later operate plant under contract with new company, is obtaining bids from contractors. Beginning of construction is tentatively planned for next spring. Target date for completion is early in 1956.

Food Machinery & Chemical to build dry ice plant

Westvaco Mineral Products Division of Food Machinery & Chemical Corporation will construct a dry ice plant at Lawrence, Kansas. Carbon dioxide from the present phosphate operation will be used as raw material. Part of the dry ice will be sold to Pure Carbonic Company, a division of Air Reduction Company. Contract for construction of unit has been let to the Wigton-Abbott Company and completion is expected by May, 1955.

Chloromethane unit on stream at Moundsville, W. Va.

Solvay Process Division, Allied Chemical & Dye Corporation, has started production of four new products at its Moundsville, West Virginia, chloromethane plant. Under construction for more than a year, new installation is producing methyl chloride, methylene chloride, chloroform, and carbon tetrachloride.

In addition to its four new products, Solvay has been producing chlorine and caustic soda at Moundsville since last December. Plant is also making by-product muriatic acid and anhydrous hydrogen chloride.

Formaldehyde unit on stream at Charlotte, N. C.

Reichhold Chemicals, Inc., has announced the completion of formaldehyde producing unit at its Charlotte, N. C., plant. First formaldehyde plant in the middle South, unit has an annual capacity of 25,000,000 pounds and is the fourth formaldehyde unit operated by Reichhold in the United States.

New Charlotte unit brings Reichhold's total formaldehyde capacity to more than 100,000,000 pounds annually. Company's other formaldehyde units are located in Seattle, Ballardvale, Massachusetts, and Tuscaloosa, Alabama.

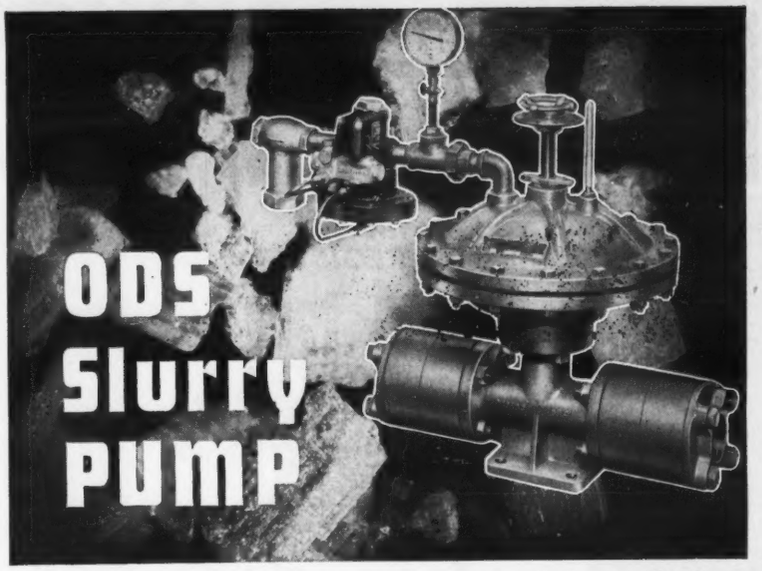
Standard Oil (Ohio) to build petrochemical plant

Standard Oil Company (Ohio) will invest $17 million in a petrochemical plant to be located in the Toledo-Lima, Ohio, area. Construction of the plant, which will produce anhydrous ammonia, urea, nitrogen solutions and nitric acid, is scheduled for completion early in the fourth quarter of 1955. Sohio's unit will have a daily production capacity of 300 tons of anhydrous ammonia, of which nearly 200 tons per day will be used in additional processing to make approximately 125 tons of urea, 60 tons of nitric acid, and over 200 tons of nitrogen solutions per day. The M. W. Kellogg Company will construct the unit.

Commercial Solvents plans nitroparaffin unit

Construction of a $5 million nitroparaffin unit at Sterlington, La., is underway by Commercial Solvents Corporation. Contract for construction of unit was awarded to Ford, Bacon and Davis Construction Corporation. Unit is expected to go on stream in August, 1955.

In addition to new construction at Sterlington, CSC's existing nitroparaffin derivatives plant at Peoria, Ill., will be enlarged. Construction of full-scale nitroparaffin facilities is another stage in Commercial Solvents' long-term chemical development. Company recently completed $20 million expansion of its methanol, ammonia and nitric acid plant at Sterlington.



. . . protects friable crystals against degradation

AND here's some proof that the ODS does protect against crystal spoilage . . . proof of the relatively gentle handling of crystalline products by the ODS Diaphragm Slurry Pump which in this case is grainer salt.

Screen Mesh	Salt at Grainer Discharge	Salt After ODS Pump*	Salt After Centrifugal Pump*
10	10.2%	11.4%	1.6%
14	17.8%	18.3%	7.3%
20	15.6%	17.7%	9.8%
28	22.0%	24.6%	11.5%
35	14.9%	14.6%	20.6%
48	10.0%	7.6%	18.6%
65	5.4%	3.1%	11.2%
100	2.2%	1.0%	6.0%
–100	1.9%	1.7%	3.4%

*Note that both pumps had a 160 foot carry and a 45 foot lift. Note also, that in certain sizes, there was actually a measurable increase in crystal size resulting from the ODS brine cooling effect.

If degradation of crystalline size and structure is important when the slurry in your process is handled, you certainly should check on the merits of the ODS Pump. Even if crystal degradation is not an important factor, other advantages will appeal to you . . . advantages such as low maintenance, no mechanical linkage to the diaphragm, no weakening holes in the diaphragm, no clogging of the valves. Write or call our nearest sales office.

308-R & 309-R

Bulletin 309-R gives full details of the ODS Pump. Shall we send you a copy?

If you are handling clear chemical solutions of any type, hot or cold, our Olivite Acid Handling Pump will probably serve you best. Shall we send you a copy of Bulletin 308-R?

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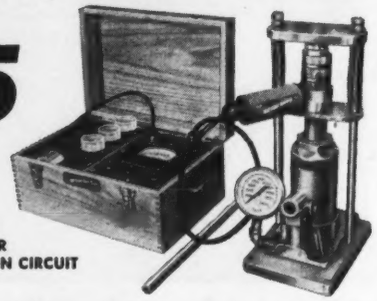
FACTORIES: Hazleton, Pa. Oakland, Calif.

When inquiring check CP 4169 on handy form, pgs. 2-3

A 1 MINUTE MOISTURE CHECK

INSURES QUALITY OF PRODUCT WHEN YOU USE THE

NEW MOISTURE REGISTER G5



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YEASTS
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Send Coupon TODAY!

ELECTRONIC MOISTURE REGISTER

Moisture Register testing equipment is the standard in moisture testing for all industries.

1510 W. Chestnut St., Alhambra, California, Dept. CP

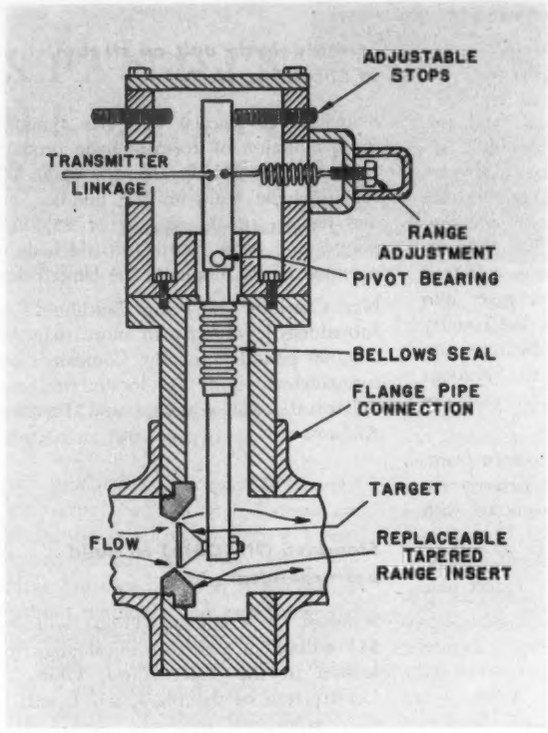
Please send me complete information on MODEL G5 MOISTURE REGISTER. I want to test _____ (MATERIAL)

NAME _____ TITLE _____

COMPANY _____ ADDRESS _____

CITY _____ STATE _____

When inquiring check CP 4170 on handy form, pgs. 2-3



Target moves in tapered meter insert. Adjustable spring restraint allows range changes

Accuracy with variable-area design achieved in . . .

direct-reading flowmeter that installs like an orifice

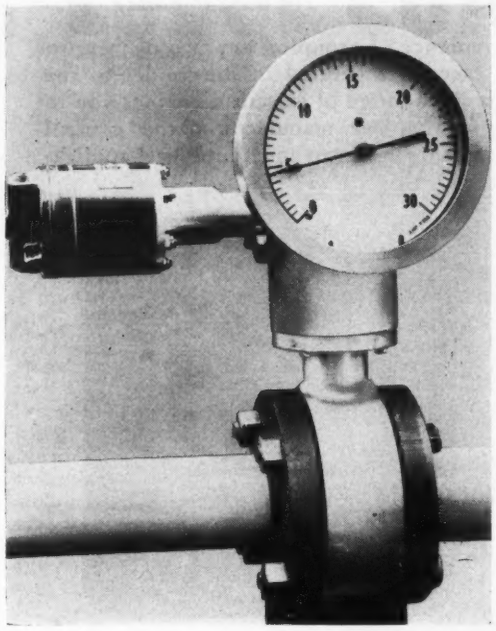
Combining simplicity of installation and operation, new primary flow measuring element is basically an in-line variable area flowmeter. It operates in a horizontal, instead of usual vertical, position. Meter is adapted for any pneumatic or electric transmitters, local controllers, or micro-switches.

Basic instrument consists of meter body (available in any machineable metal or non-metallic material), six-inch diameter dial indicator, and universal mounting pad for field or factory attachment of accessories. Meter body sizes are available for installation in pipe lines from ½ to 12" to cover flow rates from 0.2 to 2000 gpm of liquids; 10 to 60,000 lb/hr of steam, or 1 to 600 cfm of gas.

In operation, metered fluid displaces meter target horizontally. This moves in tapered insert — the greater the displacement, the larger is the annular

Salient features of the instrument include:

1) installs between flanges like orifice
2) operates at pressures to 150 psi
3) accuracy of 1% with calibration curve; without calibration curve 2%
4) shift range of 3.5 to 1 with differential pressure adjustment
5) scale range of 10 to 1
6) constant pressure drop
7) linear measurement signal



Body design allows meter to be installed between pipe flanges in any position about either axis of instrument

orifice for fluid flow. Displacement of target is directly proportional to flow rate through opening. Target displacement is transmitted to indicator through lever arm which is restrained by spring. Bellows seal on lever arm prevents leakage of metered material.

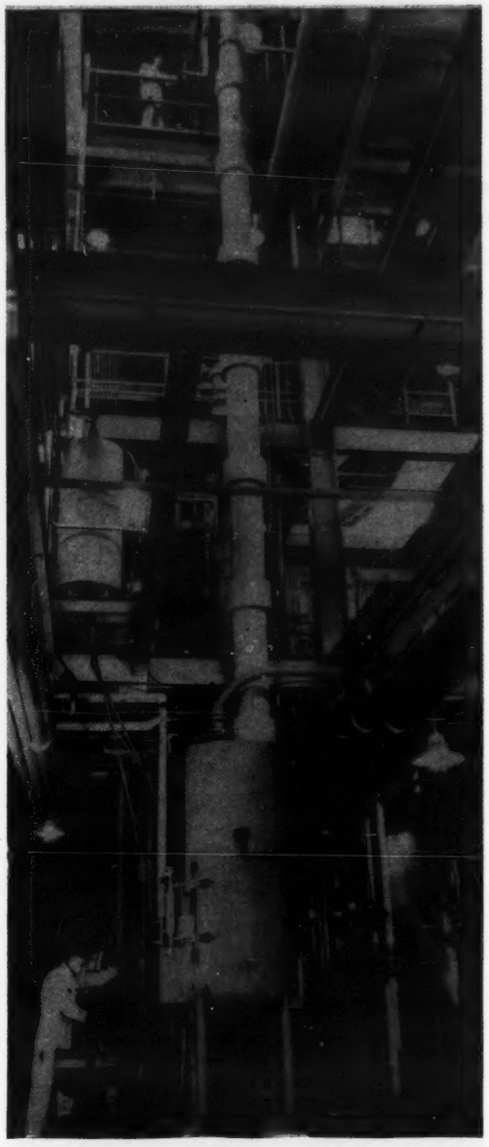
Meter body is fitted with standard meter range insert and pressure drop adjustment of from 25 to 300" of water. At any pressure drop setting within this range, flow measurement scale is 1 to 10. Shift range of 3.5 to 1 on differential pressure adjustment (spring and set-screw arrangement which restrains lever arm) extends total rangeability of meter insert to 1 to 35. Meter operates in range up to 150 psi with accuracy of 1% using calibration curve or accuracy of 2% without curve.

In-line construction of meter achieves essentially-constant pressure drop. Interchangeable metering inserts provide various flow rate ranges. Pocket-free, self-draining meter body permits passage of solids in suspension, slurries and sludges. Design allows installation in any position about either axis of instrument and between flanges in pipe line.

(Mod 1-100 flowmeters are a product of Devic-engineering Co., Dept. CP, 1701 Walnut St., Philadelphia 3, Pa. . . . or for more information check CP 4171 on handy form, pages 2 and 3.)

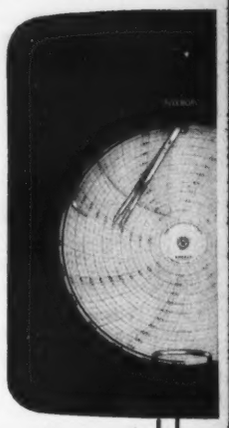
DOW CORNING

increases column throughput without impairing overhead purity



Heat input to the still of this vacuum packed fractionating column in Dow Corning pilot plant is under precise Foxboro Control. Based on pressure drop across column, Foxboro Control maintains optimum conditions at all times See diagram.

...with Foxboro Control of pressure drop

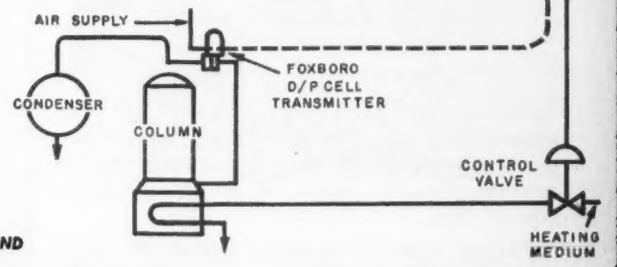


Maximum column loading with minimum priming or carry-over is one outstanding efficiency feature of Dow Corning Corporation's pilot plant production of chlorosilanes and silicones at Midland, Mich. To achieve this optimum throughput, completely unaffected by variations in product concentration, Dow chemists employed the Foxboro Pressure Drop Method of Control.

In this automatic Foxboro System, a d/p Cell Transmitter continuously measures column pressure loss caused by plate or packing resistance plus liquid and vapor mass velocities. This *true* measure of vapor product movement is relayed by the transmitter to a Foxboro M/40 Controller. The Controller precisely regulates heat input to the column . . . maintains steady boil-up for any given feed stock, without overloading.

Foxboro Pressure Drop Control will perform with the same high-efficiency on *your* column . . . whether it's packed, bubble cap, or sieve-plate type . . . on continuous or batch runs. For complete details, write for Engineering Data Sheet 282-14.

The Foxboro Company, 8112 Neponset Ave., Foxboro, Massachusetts, U.S.A.



FACTORIES IN THE UNITED STATES, CANADA, AND ENGLAND

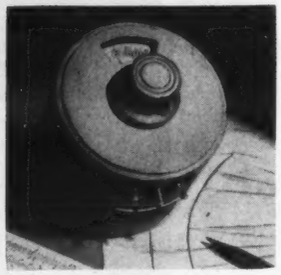
FOXBORO
Reg U.S. Pat. Off.

automatic control for fractionating column pressure-drop

When inquiring check CP 4172 on handy form, pgs. 2-3

Low output impedance is feature of precision voltage divider . . .

eliminates need for impedance-matching amplifiers in many applications

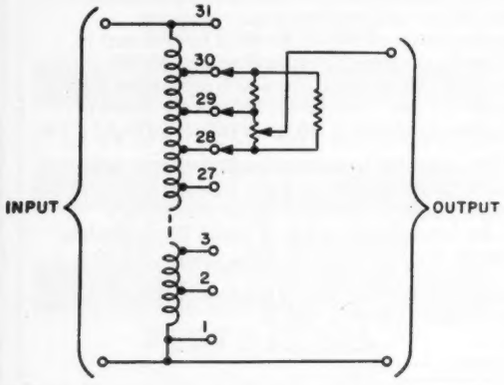


Voltage divider which is designed for servo systems and analog computers

Uses: Precision variable-ratio transformer is an electromechanical transducer for use in servo systems and analog computers. It is essentially a combination potentiometer and auto-transformer but differs from both in principle of operation.

Features: It combines low output impedance with resolution and linearity found usually only with high impedance multi-turn potentiometers. Trim resistors are unnecessary and in many applications need for impedance-matching amplifiers is eliminated.

Description: Vernistat consists of tapped auto-transformer which provides basic division of voltage into several discrete levels. These are selected and further sub-divided by continuous one-turn



Schematic of the Vernistat

interpolating potentiometer. This is connected sequentially across sections of auto-transformer synchronously with movement of potentiometer arm or wiper.

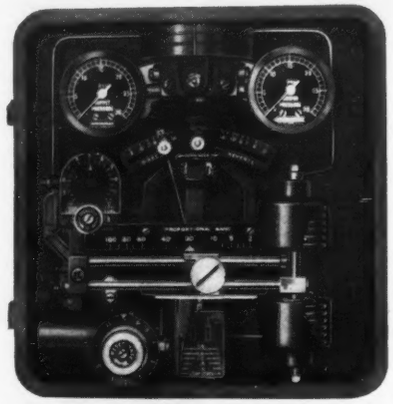
Voltage of wiper varies smoothly from one level to another throughout entire range of voltage supplied by auto-transformer. Potentiometer moving through 10 turns interpolates between any of the 30 transformer taps.

Pilot model has linearity tolerance of approximately $\pm 0.05\%$ and resolution of 0.01% at an

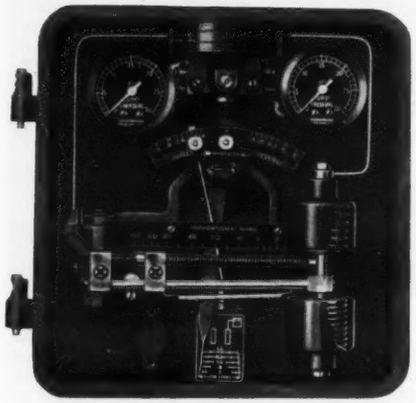
6 Reasons

Wide range of selection of the basic controller unit to fit your application is represented by the five single-unit controllers illustrated below . . . five of the many reasons why Masoneilan Liquid Level Controllers offer you more for your money. The sixth is the convenience of grouping any two of these in one case as illustrated in the model to the right. This range of selection enables you to obtain from *one* manufacturer the control equipment for almost any liquid level application.

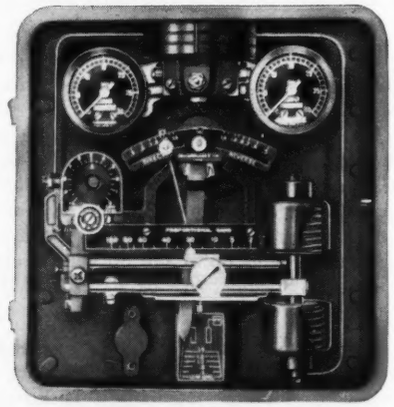
Model 12800 — The basic proportional controller; may also be used as a transmitter; may be converted in the field to a differential gap controller.



Model 12810 — Adds reset action to the proportional controller. Conversion of Model 12800 may be accomplished in the field if desired.



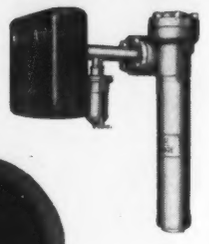
Model 12820 — The pneumatic transmitter provides an output air signal which is proportional to level changes, for indication, recording or control.

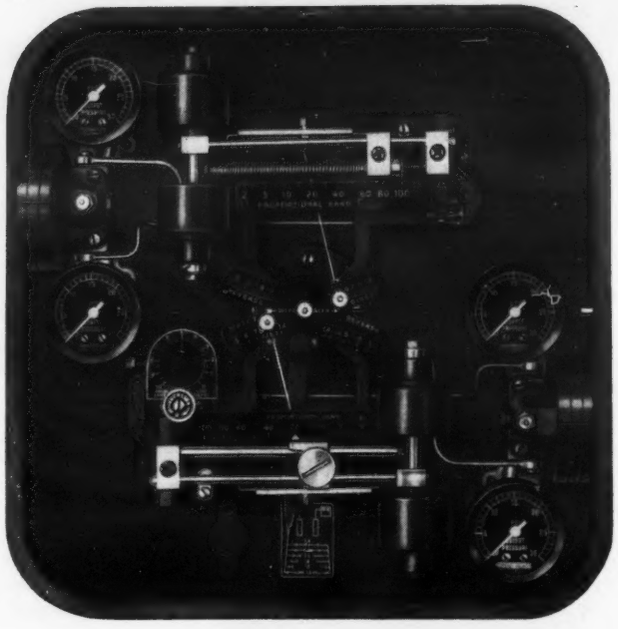


Model 12830 — The differential gap controller. May be converted to a proportional controller in the field if process changes require it.

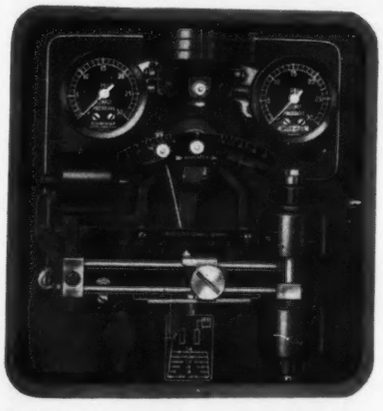
TWENTY POSSIBLE

Why You Should Select Masoneilan Level Controllers





Model 12800-20 — A duplex model grouping the proportional controller and pneumatic transmitter. Any combination of two identical or dissimilar single units is possible — a total of fifteen combinations.



Model 12840—The pneumatic set controller provides for remote adjustment of set point. Available with either proportional or proportional-reset action.

Simplicity of design; sensitive accuracy of control; wide choice of materials; ease of maintenance; convenience of installation; and sturdy, long lasting construction are six *other* reasons why you should select Masoneilan 12000 Series Liquid Level Controllers.

ALL HIGH Quality Coefficient PRODUCTS

MASON-NEILAN

REGULATOR CO.

1203 ADAMS STREET, BOSTON 24, MASS.

Sales Offices or Distributors in the Following Cities: New York • Syracuse • Chicago St. Louis • Tulsa • Philadelphia • Houston • Pittsburgh • Atlanta • Cleveland • Cincinnati Detroit • San Francisco • Boise • Louisville • Salt Lake City • El Paso • Albuquerque Charlotte • Los Angeles • Corpus Christi • Denver • Appleton • Birmingham • New Orleans Dallas • Seattle • Mason-Neilan Regulator Co., Ltd., Montreal and Toronto

INSTRUMENT COMBINATIONS

When inquiring check CP 4173 on handy form, pgs. 2-3

output impedance of 130 ohms maximum. Design permits output current of 50 ma. It operates over frequency range of 50 to 3000 cps. Other models are being developed, including one model for 400 cps and one for 60 cycle unit.

(Vernistat is a product of the Perkin-Elmer Corp. Dept. CP, Norwalk, Conn. . . or for more information check CP 4174, pages 2 and 3.)

Manual-to-automatic selector valve provides "bumpless" transfer of process control . . .

pneumatic instrument uses less than 0.2 cfm with air supply pressure of 30-35 psi

Uses: For automatic and hand control of a complete pneumatic system or integral parts of system. Units may be located at control station or at independent remote control station.

Features: Automatic-to-hand transfer and back again may be made without "bumping" control system. Miniature size of instrument permits efficient arrangement of central control station.

Description: Selector valves are available in three basic types: 1) basic selector, 2) set point selector, and 3) bias selector. Control pressure

Selector valves on large console panel

ranges are 3-27, 3-15, and 5-25 psi. Gages calibrated to ¼ psi at zero and maximum scale limits.

(Mini-Line Selector Valves are a product of Bailey Meter Co., Dept. CP, 1050 Ivanhoe Rd., Cleveland 10, Ohio . . . or for more information check CP 4175 on the convenient Reader Service slip located between pages 2 and 3.)

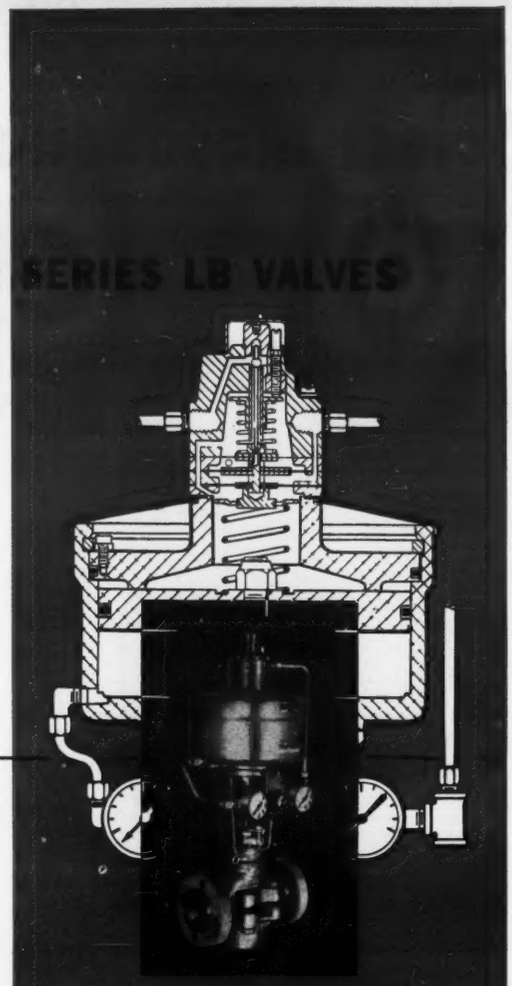
OUTMODES ALL OTHERS

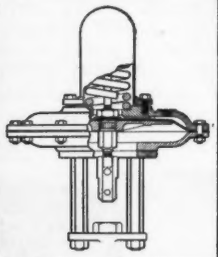
for Throttling Control Service

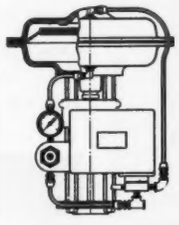
. . . CONOMOTOR SERIES LB VALVES

Conoflow is unbiased in evaluating the relative merits of the Cylinder Conomotor over spring-and-diaphragm and springless diaphragm motors. Conoflow makes all three. But look at the chart below . . . There's not merely an "edge", but a *wide margin* of superiority in the Cylinder Conomotor . . . in weight . . . in compact size . . . in speed of operation . . . stem travel . . . and thrust. No other operator surpasses it for positioning accuracy and stability of operation. Diaphragm breakage is eliminated and maintenance is greatly reduced. It's easy to convince yourself. Just try one or several . . . and you'll standardize right down the line on Conomotor Series LB Control Valves.

(COMPLETE DETAILS IN CATALOG LB-1)







MODEL	B-10-TM Spring & Diaphragm Motor	B-12-T Springless Diaphragm Motor	B-53 Cylinder Conomotor
PISTON OR DIAPHRAGM AREA	←	50 square inches	→
THRUST	750 lbs.	1250 lbs.	4500 lbs.
STEM SPEED	12 seconds	10 seconds	4 seconds
TRAVEL	1"	1⅜"	4"
MAXIMUM SUPPLY PRESSURE	30 psi	30 psi	100 psi
WEIGHT	45 lbs.	45 lbs.	25 lbs.
SIZE	11¾" dia. 16¾" height	11½" dia. 14¾" height	9" dia. 14" height

Cono-Controls®

CONOFLOW CORPORATION

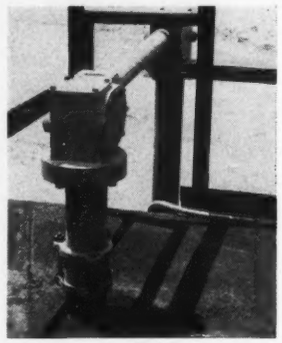
2100 ARCH STREET PHILADELPHIA 3, PA.

When inquiring check CP 4176 on handy form, pgs. 2-3

Measures liquid level in tanks without using either floats or sonic mechanism . . .

accuracy of ± 1/16" maintained with electronic measuring device

Uses: For measuring liquid depth of any petroleum product at temperatures up to 175°F as well as other liquids.

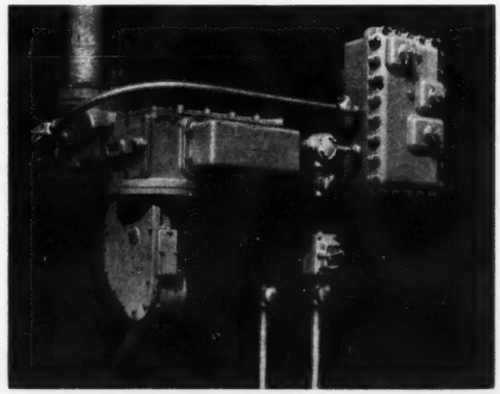


Gage at top of cone roof tank. Flexible coupling pulley boxes and top of stand pipe enclose stainless steel perforated tape and radio frequency cable

Features: Gage can be installed in existing tanks, in any liquid, without taking tank out of service. No guide rods or wire are required inside of tank and no welding or riveting is necessary in hazardous areas.

Gage is unaffected by specific gravity variations of liquid and by varying friction in sheaves.

Description: Gage has three main components: sensing element, electronic control box and servo-motor box. Sensing element is suspended within tank from perforated stainless steel tape. Tape runs over pulleys



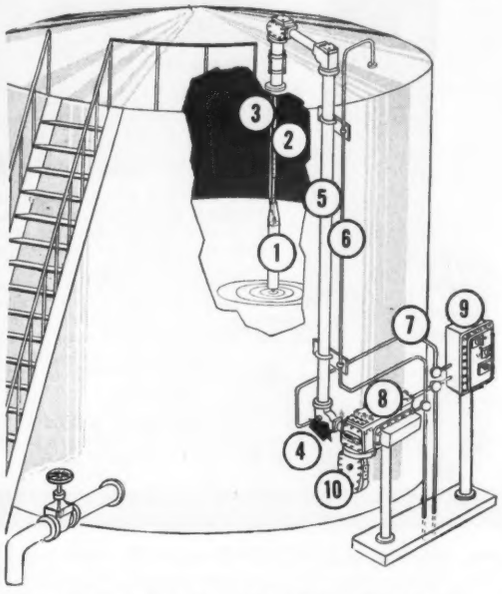
Electronic tank gage installation at base of tank. Servo-motor box with tape retriever and ground reading liquid level indicator is at left. Electronic control box is on right

to sprocket on servo-motor. Ground level reading instrument calibrated in sixteenths is connected to motor shaft.

Electronic signals originate and are received in electronic control box. This houses simple four-tube electronic circuit of standard radio parts. Signals

travel over shielded radio frequency cable which runs parallel with steel tape to sensing element.

If remote transmission is desired, precision potentiometers and gearing are mounted inside motor box. Gage uses no float or sonic mechanism. Servo-motor



1) sensing element 2) perforated tape 3) radio frequency cable 4) pulley boxes 5) stand-pipe 6) resistance thermometer leads 7) cable conduit 8) servo-motor box 9) mechanical counter 10) tape retriever

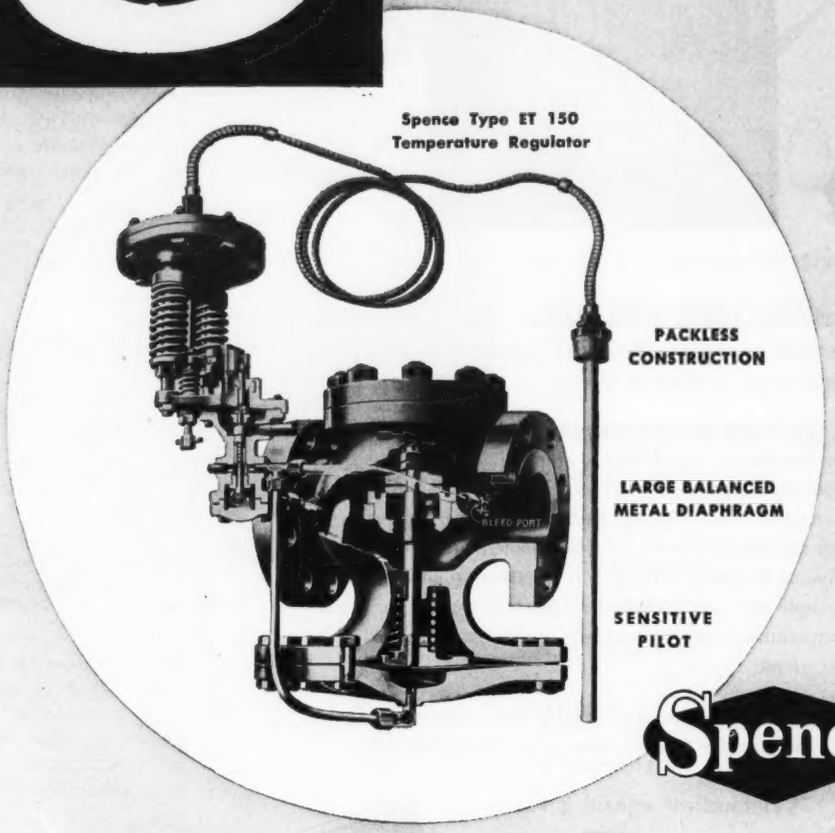
responding to electronic signals, raises and lowers sensing element as liquid level rises or falls in tank.

(Tank Gage is a product of the Gilbert & Barker Mfg. Co. Dept. CP, West Springfield, Mass. . . . or check CP 4177 on handy form, pages 2 and 3.)

Need instrumentation for that process?

You'll find just what you need in the alphabetized, itemized Product Directory on pages 199 to 201. All subjects and products presented in ads and editorial columns are there.

3 Reasons for Accurate Regulation



Spence

Packless construction eliminates the need for closely fitted parts that may stick or bind due to dirt or uneven expansion of the parts.

In Spence Temperature Regulators, the Main Valve is actuated by a large balanced metal diaphragm which responds to the slightest changes in temperature.

Sensitive Pilots are designed to limit heater pressure to an adjustable maximum. As the temperature at the thermostat drops a few degrees there is a corresponding increase in steam pressure up to the limit for which the Pilot is set.

With regulators that respond only to temperature, an increase in load is accompanied by a momentary decrease in steam pressure caused by faster condensation in the heating element. There is a time lag until the thermostat senses the temperature drop and opens the valve wider. Spence Temperature Regulators act like pilot operated pressure regulators when this occurs. They respond instantly to maintain the steam pressure until the thermostat has a chance to further increase it as needed for the heavier load.

These plus other design features explain why Spence Temperature Regulators function dependably and accurately year after year, without requiring extensive repairs or special attention.

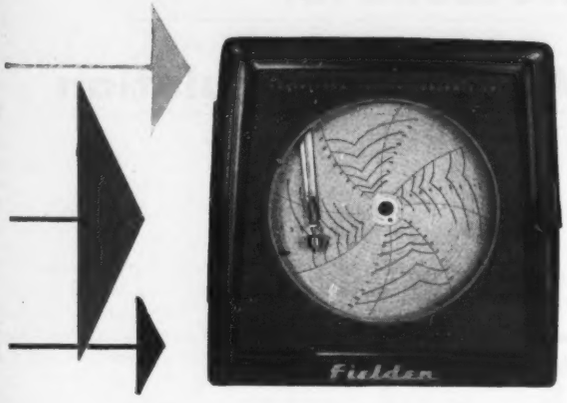
Want more facts? Write for Bulletin T50 giving full details.

BE128

SPENCE ENGINEERING COMPANY, INC., Walden, New York

When inquiring check CP 4178 on handy form, pgs. 2-3

must a well engineered chart recorder be expensive?



fielden says, "no!" when you can install a MULTIPOINT Recorder with up to 48 or 96 separate points—with each point available at a cost unheard of before!

Reason: Simplified design, circuitry, and construction. The chart mechanism is rugged, but so simple in form that there is little or no maintenance throughout the life of the instrument. Yet it's *accurate*—to ±½% of full scale, with a sensitivity of 0.1% and reproducibility of ±0.5%. Fielden furnishes 3 types of Multipoint Recorders: TEKTOLOG electrical quantity for pH, thermocouple and tachometry; A.C. NULL BALANCER for resistance temperature and conductivity measurements; and D.C. NULL BALANCER.

Does simplified, low cost—and reliable instrumentation appeal to you? Then use the coupon below today for full details.

Robertshaw-Fulton
CONTROLS COMPANY

FIELDEN INSTRUMENT DIVISION
2920 N. 4th St., Dept. G, Philadelphia 33, Pa.

Send full details on the Fielden Multipoint Recorders checked below.

☐ TEKTOLOG Electronic Recorders ☐ A.C. NULL BALANCE Recorders
☐ D.C. NULL BALANCE Recorders

Name_____

Title_____

Company_____

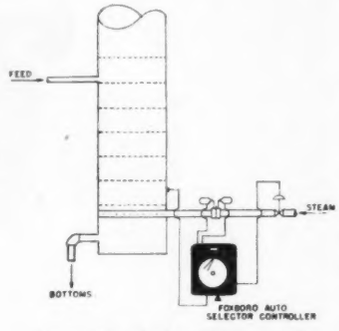
Address_____ City_____ State_____

When inquiring check CP 4179 on handy form, pgs. 2-3

Prevent build-ups of high pressure in "strippers"

Direct steam-heated stripping columns can be protected against pressure build-ups caused by clogged trays with control system originally developed for beverage alcohol industry.

System employs controller which permits a fixed flow of steam to column until clogged trays force bottom pressure to critical point. At this point, pressure governs



Application of steam flow control to direct-heated fractionating column

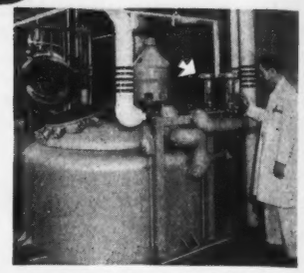
flow of incoming steam. Instrument regulates steam valve to keep pressure in column below prescribed limit, allowing maximum throughput consistent with tray conditions.

When trays are cleared, column reverts to flow control. Transfers between flow and pressure control are instantaneous. If desired, electric alarm contacts can be provided to signal when column goes on pressure control, thereby warning operator that trays need cleaning.

System has advantages over conventional control methods because no marked upset occurs in process and losses of volatile material in bottom of stripping column are minimized.

(System, which uses Auto-Selector C Controller, is a development of The Foxboro Co., Dept. CP, 174 Neponset Ave., Foxboro, Mass. . . . or for more information reader may simply check CP 4180 on handy form, pages 2 and 3.)

More and more Prominent Users of POWERS **FLOWRITE** Diaphragm Control Valves



New ARMOUR PHARMACEUTICAL CENTER is using Powers Characterized V-Port Valves for accurate control of steam, water, vacuum and propylene glycol for various processes. Powers **FLOWRITE** premium quality valves are reasonably priced. Their points of superiority are described in Bulletin 344-V. Write for a copy.

THE POWERS REGULATOR CO.
Skokie, Ill. • Offices in 60 Cities
See Your Phone Book

Over 60 Years of Automatic Temperature and Humidity Control

When inquiring check CP 4181 on handy form, pgs. 2-3

King MANOMETERS

Every Size – for Every Service

U-Type Manometers
- Single Cleanout
- Single Gland-Packed
- Double Cleanout
- Double Gland-Packed
- High Pressure

Low in price Trouble-free Easy to install and read

Well-Type Manometers
- Low Well
- Raised Well
- Barometric Reading

Stay clean longer Easy to service

Multi-Tube Manometers
- Multi-Well
- Common-Well
- Special-Purpose

FREE LITERATURE gives sizes, construction and prices. Write today! And ask for informative 12-page Manual on Manometers.

KING ENGINEERING PRODUCTS include King-Gages — Manometers — Self-Closing Push Valves — Pressure Transmitters — Sight Feed Bubblers — Overflow Check Valves — Air-flow Snubbers — Sediment Traps — Moisture Indicators

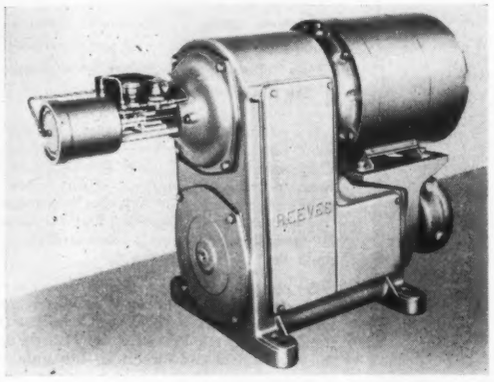
KC INSTRUMENTS **KING ENGINEERING CORP.**
Box 270 • Ann Arbor, Mich.
REPRESENTATIVES IN PRINCIPAL CITIES

When inquiring check CP 4182 on handy form, pgs. 2-3

Air signals change pulley size on power unit to provide linear speed changes . . .

uses positioner air pressure of 3-15 psi and supply pressures up to 80 psi

Uses: Designed for continuous correction of operating speeds to compensate for changes in material or energy variations of a process. Unit may be used for controlling flow, heat, pressure,



Pneumatic control is mounted on drive unit

temperature, liquid level, color, light density, or other processes that can be converted to, and transmitted by, pneumatic signals.

Features: Cam control and positioner combination gives linear speed changes in proportion to instrument air pressure.

Description: Bellows and pilot valve arrangement control air supply into cylinder. Piston, connected to yoke, moves pulley disc assembly in or out — thereby changing effective diameter of pulley. Changes in pulley disc diameter achieve definite increment of rpm change on output shaft of unit. Control unit is mounted on manufacturer's Vari-Speed Motodrive.

(Auto-Pneumatic Control and Vari-Speed Motodrive are products of Reeves Pulley Company, Dept. CP, 1225-7th Street, Columbus, Indiana . . . or check CP 4183, pages 2 and 3.)

Temperature monitoring system described and explained

Specifications and components for temperature monitoring system are presented in 10-page bulletin. Functional diagrams and photographs illustrate advantages of system.

Bul 70 is issued by Thermo Electric Co., Inc., Dept. CP, Saddle River Township, Rochelle Park Post Office, N. J. Check CP 4184, pages 2 and 3.

new additions

to this comprehensive line of

MODERN PRECISION PORTABLES

WESTON 901 LINE

D-C
- Voltmeters
- Volt-Ammeters
- Ammeters
- Milliammeters

A-C
- Voltmeters
- 8 Range Voltmeters*
- Ammeters
- 7 Range Ammeters*
- Milliammeters

A-C and D-C single-phase Wattmeters*

Providing unequaled scale visibility due to wrap-around windows, the same rated accuracy of 0.5% and the same efficient shielding of all other instruments in this famous line, these three new additions make the 901 group the most comprehensive line of precision portables available. Complete specifications and prices available in bulletin form, or from the WESTON representative in your vicinity . . . WESTON Electrical Instrument Corporation, 614 Frelinghuysen Avenue, Newark 5, New Jersey.

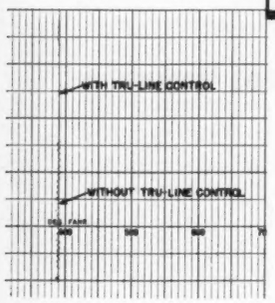
WESTON *Instruments*

When inquiring check CP 4185 on handy form, pgs. 2-3

BARBER COLMAN

NEW Wheelco Model 402 Capacitrol

Modern method for controlling batch or continuous processes



TRU-LINE time-proportioning control eliminates under- and over-shooting

Here's the instrument *you designed,* subconsciously perhaps, in your efforts to improve process control and reduce costs! You've hoped for closer time-proportioning control —TRU-LINE gives it to you *electronically.* You've been looking for new simplicity and dependability in instruments — interchangeable unit construction of the "Model 402" anticipates service needs and makes on-the-job modifications easy. And perhaps you've anticipated improvements and conveniences possible through modern *functional design* — look for the Capacitrol to set a new design trend in instruments. For accurate control of batch or continuous processes, the new Wheelco "Model 402" is the instrument you've been waiting for! Write for Bulletin F-6314-1.

WHEELCO INSTRUMENTS DIVISION

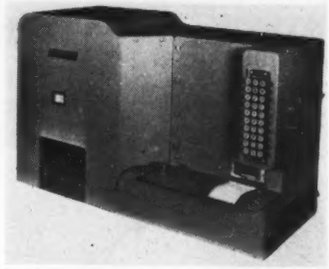
BARBER-COLMAN COMPANY, DEPT. L, 1520 ROCK STREET, ROCKFORD, ILLINOIS
BARBER-COLMAN OF CANADA, LTD. • TORONTO, ONTARIO, CANADA

Industrial Instruments•Automatic Controls•Air Distribution Products•Aircraft Controls•Small Motors
Overdoors and Operators•Molded Products•Metal Cutting Tools•Machine Tools•Textile Machinery

When inquiring check CP 4186 on handy form, pgs. 2-3

Prints forces or weights in units to 4 digits on tape

Uses: Designed for receiving signals from resistance wire strain gage devices that measure forces, weights, pressures, or torque. Printer is applicable to either industrial weighing or laboratory recording of load and pressure.



Identification keys for figures or letters are optional on digital printer (shown above)

Features: Three or four digits can be printed on continuous tape, tickets, or sheets up to 8½ x 11" with or without carbons. Printing can be manually actuated or automatic at preset interval.

Description: Printer operates on automatic null balance electrical circuit. System accuracy is within ±0.2% with readability and sensitivity to 0.1% for single interval model. Standard response speed is 12 or 24 seconds but can be faster if specified. Identification keys for figures or letters are optional.

(Baldwin SR-4 Digital Printer is a product of Baldwin-Lima-Hamilton Corp., Dept. CP, 940 Simpson St., Eddystone 42, Pa. Check CP 4187, pages 2 and 3.)

Describes instrumentation for smelt-dissolving tank

Illustrated two-page application bulletin explains instrumentation system for smelt-dissolving tank.

Bul 90-130-15 is available from Fischer & Porter Co., Dept. CP, 400 County Line Road, Hatboro, Pa. When inquiring specify CP 4188, pages 2 and 3.

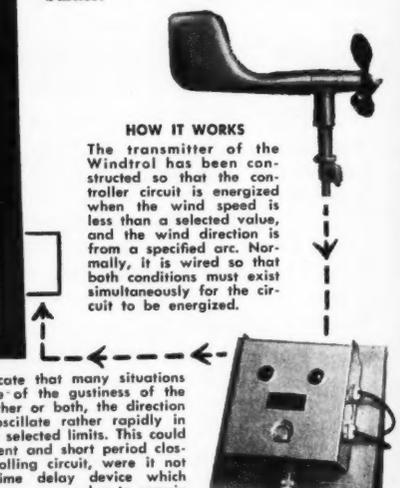
AIR POLLUTION

How To Make Your Smoke Stack Act Taller Than It Is!

New wind operated, automatic controller energizes forced draft or heat systems under unfavorable meteorological conditions . . . thereby increasing "effective stack height." It's called The Bendix-Friez Windtrol*.

For example, the plant that we're talking about has a relatively low stack. The release of fly ash with its stack effluent results in many complaints under certain meteorological conditions. How can this be corrected . . . without great expense? Let's see what the principles of stack meteorology can show us.

By checking wind speed and direction . . . unfavorable quadrant can be discovered. First, you install at near stack height the Bendix Windtrol Transmitter. This detects the wind speed and direction. The unfavorable quadrant is established for air pollution and the controller (located indoors on any convenient wall) is wired accordingly. The controller is then connected to a forced draft fan, a booster blower or a stack oil burner.



HOW IT WORKS

The transmitter of the Windtrol has been constructed so that the controller circuit is energized when the wind speed is less than a selected value, and the wind direction is from a specified arc. Normally, it is wired so that both conditions must exist simultaneously for the circuit to be energized.

Observations indicate that many situations will arise because of the gustiness of the wind in which either or both, the direction and speed will oscillate rather rapidly in the vicinity of the selected limits. This could result in intermittent and short period closures of the controlling circuit, were it not for a built-in time delay device which causes the actuating power relay to remain open or closed for a given length of time after the direction or speed has changed from the required limits.

For further information, write today.

*Pat. Appl. for

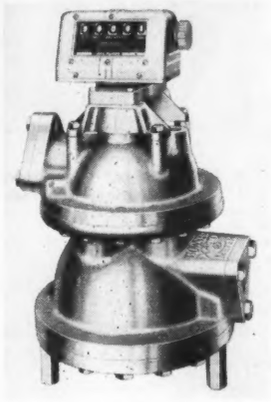
Bendix - Friez

FRIEZ INSTRUMENT DIVISION OF BENDIX AVIATION CORPORATION
1450 TAYLOR AVENUE, BALTIMORE 4, MARYLAND
Export Sales, Bendix International Division,
205 E. 42nd St., New York 17, N. Y., U. S. A.

When inquiring check CP 4189 on handy form, pgs. 2-3

Measures liquid flow to 50 gpm in pressure range to 500 psi . . .

working parts of meters are stainless steel



Meters (as one pictured above) are stainless steel with hard carbon bearings and Teflon pistons

High-pressure meters are designed to give positive displacement accuracy on industrial liquid measuring jobs which require high-pressure. Two models are available; one rated at 15 gpm, the other, 50 gpm. Both work at pressures to 500 psi.

Working parts of meters are stainless steel with hard carbon bearings and Teflon pistons. Meters may be equipped with straight-reading, totalizing or ticket-printing dials. Both models are designed for either top or bottom mounting.

(Mods 470-15-4 and 470-50-4 flow meters are products of Bowser, Inc., Dept. CP, 1300 Creighton Ave., Fort Wayne 2, Ind. Check CP 4190, pages 2 and 3.)

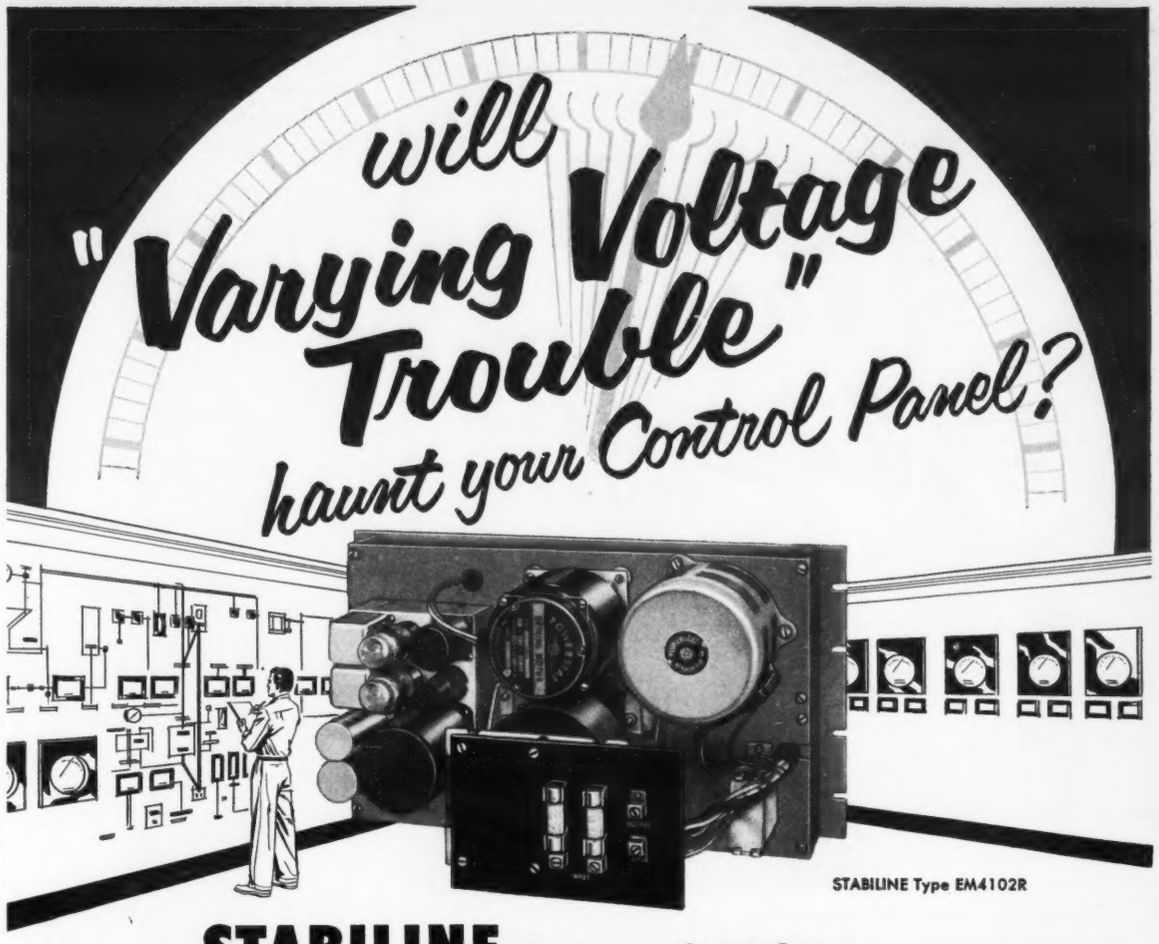
Measures pressure or temperature from remotely located detection points . . .

signals transmitted over lines or micro-wave relay facilities

System for telemetering pressure and temperature uses high resolution, electromagnetic, rotary transducer with linear output. Fluid pressure in a Bourdon tube or temperature sensitive bi-metallic ribbon spiral rotates signal generator a minute amount producing proportional electrical signal.

Complete measuring system consists of 60cy current source, pressure or temperature detectors which can be directly mounted on vessel or pipe line, and indicating long scale meter mounted on control panel remotely located from detection points. Additional features of system include high output without amplification, stability unaffected by either lateral or longitudinal vibration and line voltage changes, and withstands 100% overloads.

(ElectroSyn Measuring Systems are a product of Controls Div., Control Engineering Corp., Dept. CP, 934 Washington St., Norwood, Mass. . . . or for more information check CP 4191, pages 2 and 3.)



STABILINE Type EM4102R

Have a STABILINE Automatic Voltage Regulator designed into your control panel

Avoid hard to diagnose troubles *before they start*. Many times "varying voltage troubles" are hard to predict and too often are at the bottom of the trouble check list.

Whenever electric or electronic gear is in the control system, a varying voltage can start disastrous re-cycling and other process control "bugs". You can never be *sure* that voltage variations are not going to be beyond the safety range of your control panel.

When a STABILINE Automatic Voltage Regulator is part of the original specifications, your worries are over as far as a source of accurate voltage is concerned.

STABILINE Automatic Voltage Regulators Type EM feature:

1. 115, 230 and 460 volt ratings for single and three phase duty in capacities up to 100 KVA.
2. Zero waveform distortion.
3. Correction speeds from .075 to .32 seconds per volt.
4. High efficiency comparable to fixed-ratio transformers.

Write for full details and see the Superior Electric Mobile Display when it is in your area.

THE SUPERIOR ELECTRIC COMPANY

812 CLARKE AVENUE, BRISTOL, CONN.

Manufacturers of: Powerstat Variable Transformers • Stabiline Automatic Voltage Regulators • Voltbox A-C Power Supplies • Powerstat Light Dimming Equipment • Varicell D-C Power Supplies • Superior 5-Way Binding Posts

THE SUPERIOR ELECTRIC COMPANY
812 Clarke Avenue, Bristol, Conn.

Please send STABILINE Bulletin S351.

Name.....

Position.....

Company Name.....

Company Address.....

City.....Zone.....State.....

When inquiring check CP 4192 on handy form, pgs. 2-3

With NIAGARA METERS

They're Controlling

LIQUID VOLUME *Automatically*

YOU CAN DO IT TOO!

- FOOD INDUSTRIES
- CHEMICAL PLANTS
- DAIRY PRODUCTS
- SYNTHETIC TEXTILES
- PETROLEUM

Imagine the time and guesswork you can save by measuring liquid volumes automatically. Just set the hand of the NIAGARA Electri-Contact METER at the volume desired and turn on the flow of liquid.

SET IT — FORGET IT

It will turn off automatically. NIAGARA METERS enable your men to handle more work.

Practically every type of industry is using and acclaiming the accuracy of NIAGARA METERS. They precisely measure liquid volumes from one to one thousand gallons a minute!

There's a NIAGARA METER for nearly every type of liquid including most chemicals. Investigate the advantages of NIAGARA METERS.

Write today for full details.

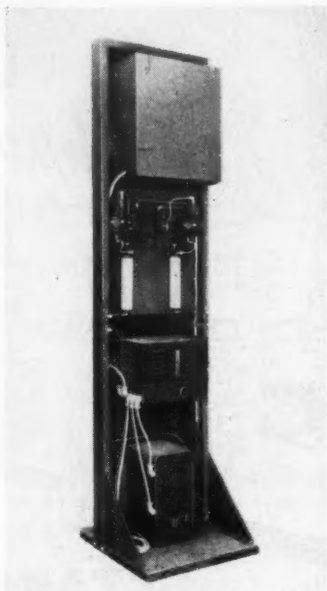
BUFFALO METER CO.

2892 MAIN STREET • BUFFALO, NEW YORK

When inquiring check CP 4193 on handy form, pgs. 2-3

Monitor trace impurities in plant stream with analyzer

Panel instruments monitor various mixtures and trace impurities in plant streams or laboratory samples. Unit has sensitivity of +0.0005% in range of 99.5 to 100% argon or sensitivity of 0.01% in range of



Mounted in cabinets or cubicles

99 to 100% oxygen. Panels are ready to install in industrial processing systems. Equipment includes electronic recorder, flow regulators and meters, drying towers, and power pack with regulated DC.

(Gas analyzers are a product of Gow-Mac Instrument Co., Dept. CP, 100 Kings Rd., Madison, N.J. Check CP 4194, pages 2 and 3.)

Supplies data on line of potentiometers

Complete line of sine-cosine, step function, and miniature potentiometers is presented.

Potentiometer bulletins are issued by Control System Components, Dept. CP, 218 E. Hartsdale Ave., Hartsdale, N.Y. Specify CP 4195, pages 2 & 3.

THE CAMBRIDGE

INDUSTRIAL MODEL DIRECT READING

pH METER

- Operated from any AC outlet
- Completely portable. Weighs only 10 lbs. Electrodes are integral parts of the instrument.
- Accurate to .10 pH.
- Shielded glass electrodes permit use of electrodes at any distance from the instrument.
- May be used on a bench or wall mounted.
- Self contained in one metal case including electrodes and buffer solutions.
- Extremely stable.
- Automatic temperature compensation.

Send for bulletin 910-NA.

Also available: Electron-Ray Research Model accurate to .02 pH and Laboratory Model accurate to .05 pH Single- and Multi-point recorders.

CAMBRIDGE INSTRUMENT CO., INC.

3706 GRAND CENTRAL TERMINAL NEW YORK 17, N. Y.

Pioneer Manufacturers of

PRECISION INSTRUMENTS

When inquiring check CP 4196 on handy form, pgs. 2-3

NEW

DWYER FLEX-TUBE Series 25

THE

MANOMETER

THAT

- *COSTS HALF as much*
- *Is only HALF as BIG*
- *IS ACCURATE to 3%*
- *Does 4 NEEDED JOBS*

and is practically indestructible!

Only 7⅞" wide, 5⅞" high and 1½" deep. Housing and tube of tough Tenite II plastic. Logarithmic indicating tube for accurate and easy reading. Two ranges: 0-3" and 0-7". Gages (1) static pressure, (2) draft, (3) filter resistance and (4) velocity from 0-7000 fpm. (with pitot tube).

A complete "package". Unit includes all necessary connector tubing and fittings, mounting screws, fluid, instructions.

Write for informative catalog page

DWYER *Specialized* **INSTRUMENTS and GAGES**

F. W. DWYER MFG. CO. • 335 SO. WESTERN AVE. • CHICAGO 12, ILL.

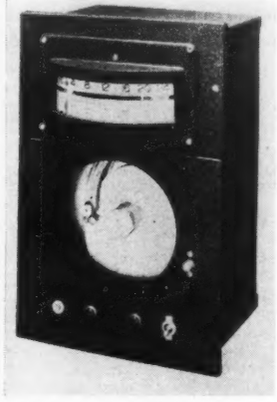
When inquiring check CP 4197 on handy form, pgs. 2-3

Repeats time-temperature cycles automatically and controls secondary action . . .

provides off-on, proportioning, high limit or stepless control action

Uses: Designed for automatic process control of any time-temperature cycle.

Features: Secondary control feature of instrument permits installation of additional micro switches and actuators on program disc. Timers, stepping relays, additional heating or cooling, warning lights. etc., can thus be used with controller.



Combines indicating pyrometer and program controller

Description: Current from thermocouple actuates millivoltmeter which swings pointer across calibrated scale. Setting arm, carrying setting pointer, is moved along the scale by controlling cam. Light source and photocell are mounted on setting arm. When temperature reaches point where millivoltmeter pointer and set pointer coincide, an opaque flag on mv meter interrupts light beam. When current flow is interrupted, relay opens and heat input is shut off.

Instrument draws 14w from either 115 or 230v, 60 cy AC power supply. Contact ratings are 4 amp at 115v AC or 2 amp at 230v, non-inductive.

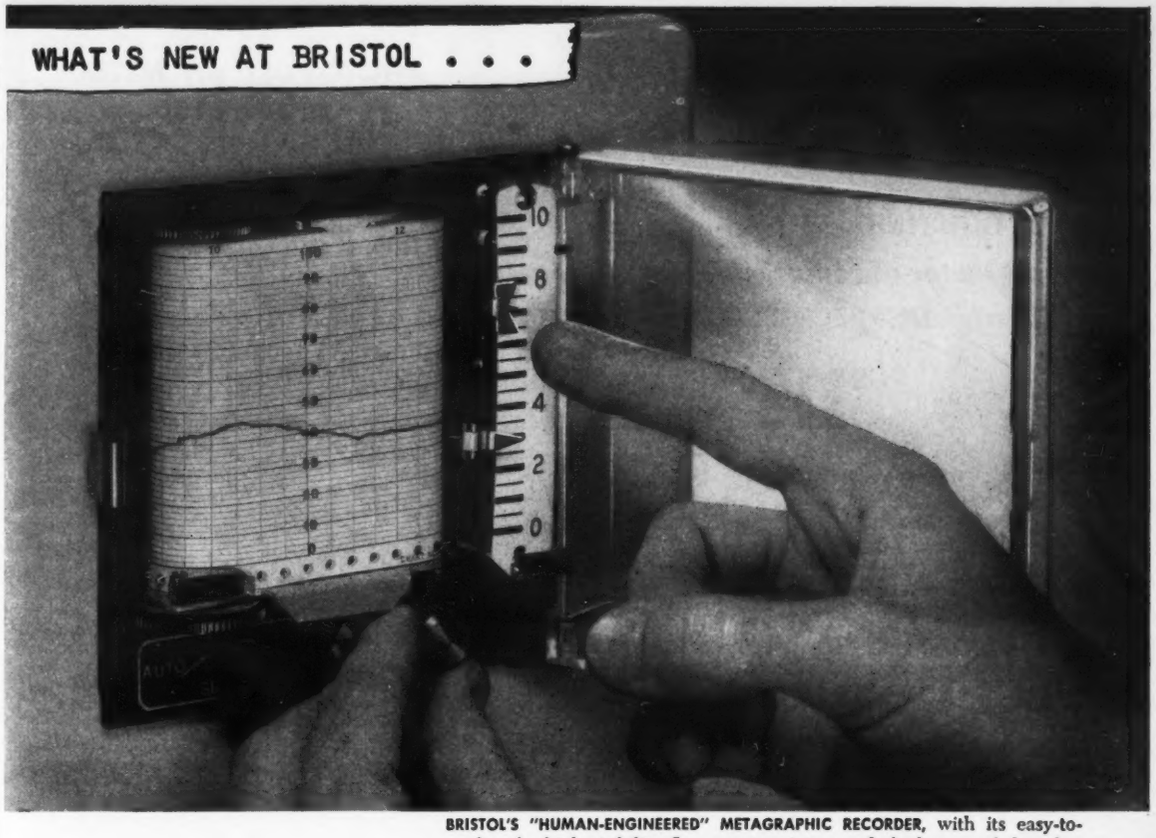
(Mod JG Series Program Controllers are a product of West Instrument Corp., Dept. CP, 525 N. Noble St., Chicago 22, Ill. . . . or for more information check CP 4198 on handy form, pages 2 and 3.)

Bulletin explains temperature-EMF standards for thermocouples

Bulletin of 14 pages shows temperature-EMF relation for iron-constantan thermocouples. Tentative standard has been approved by the Recorder-Controller Section of the Scientific Apparatus Makers Association.

Iron-constantan thermocouple standard is published by Recorder-Controller Section of Scientific Apparatus Makers Association, Dept. CP, 522 5th Avenue, New York 36, N. Y. When inquiring specify CP 4199 on handy form, pages 2 & 3.

WHAT'S NEW AT BRISTOL . . .



BRISTOL'S "HUMAN-ENGINEERED" METAGRAPHIC RECORDER, with its easy-to-read scale, high-visibility fluorescent pointers and shadow-proof door has earned the distinction of being the "biggest little instrument in the business."

Instrument men call Bristol's METAGRAPHIC Recorder

"...the biggest little instrument"

Sounds contradictory, but it's true. Take a look at one of our new METAGRAPHICS mounted on a panel board alongside of other instruments. The Bristol unit stands out – seems bigger than the rest – although chances are it's actually smaller (5" x 5½"). The answer is that the Bristol instruments have been "human-engineered", making them easy to read, and clearly visible at greater distances.

The air-operated METAGRAPHIC, which records pressure, temperature, vacuum, flow, differential pressure, and liquid level, offers these big advantages:

SIMPLICITY . . . fewer moving parts, fewer adjustments, and less service required. Range changes can be made in seconds. True plug-in service.

CONTINUOUS VALVE-POSITION INDICATION . . . on same instrument scale as set-point scale, gives continuous data on control valve position—makes "bumpless" transfer possible simply by matching pointer positions – no need to read actual scale values – minimizes reading errors – speeds operations.

CONTINUOUS OPERATION . . . complete unit can be retracted for inking pen, and for set-point and zero adjustment without disturbing record or control.

Get the whole story on the "human-engineered" METAGRAPHICS – how they can help you get more accurate measurements, faster and easier. Write us today. The Bristol Company, 141 Bristol Road, Waterbury 20, Conn.

BRISTOL

POINTS THE WAY IN HUMAN-ENGINEERED INSTRUMENTATION

6.4.4R

AUTOMATIC CONTROLLING, RECORDING AND TELEMETERING INSTRUMENTS

When inquiring check CP 4200 on handy form, pgs. 2-3

Thank modern electronics for this:

A full-fledged line-operated pH Meter of remarkable accuracy at the UNPRECEDENTED price of

$115.00

. . . made possible by recent advances in electronic tubes and circuits.

Write for Bulletin #225 to

PHOTOVOLT CORPORATION
95 MADISON AVENUE • NEW YORK 16, N. Y.

PHOTOVOLT pH METER MOD. 115

- **SIMPLE in operation and maintenance.**
- **FAST and dependable in daily service.**
- **FULLY stabilized for wide range of line voltage fluctuations.**

When inquiring check CP 4201 on handy form, pgs. 2-3

TO POSITION DAMPERS, SLIDE VALVES and other control means

ASKANIA
PNEU-DRAULIC VALVE POSITIONER

The Askania Pneu-Draulic Valve Positioner combines the advantages of both pneumatic and hydraulic control systems. It provides an air signal proportional to valve position, yet has incompressible fluid working at the heart of the unit.

Almost unlimited power can be smoothly and instantly applied with these positioners. For every increment of input signal between 3 and 15 p.s.i., the cylinder position finds a specific position within 1% of full cylinder stroke.

These positioners are rugged enough to withstand almost any abuse, because the signal amplifier has only one moving part—the well protected jet pipe.

Write for bulletin No. 1—86

ASKANIA REGULATOR COMPANY
242 E. Ontario Street, Chicago 11, Illinois
Subsidiary of General Precision Equipment Corp.

When inquiring check CP 4202 on handy form, pgs. 2-3

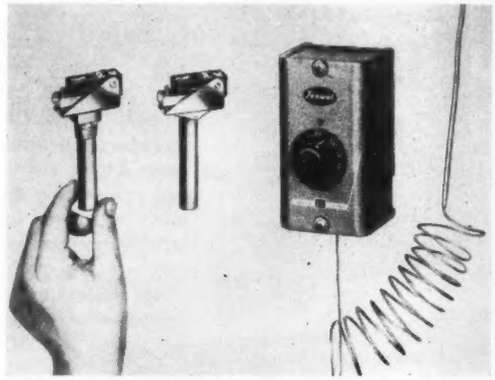
Heavy-duty load carrying capacity, small differential combined in thermostats . . .

units available for direct or remote installation

Uses: For applications where thermostat must carry heavy electrical loads (20 to 35 amp) without relay.

Features: Local bulb unit for liquid-filled thermostat has adjustable 50 to 300°F range. Remote units have ranges of 50 to 250°F and 150 to 550°F.

Description: Liquid-filled, snap-action thermostats consist of sealed bellows encased in liquid-filled outer shell with sensitive snap switch in direct linkage. On temperature rise, liquid expands against bellows and closes electrical contacts. Thermostats have inherent differential of 2 to 3°F. Response mechanism is protected against extreme temperature overshoot by snap switch pivoting against torsion spring. This permits whole assembly to "lift" without damage if exposed to extreme temperatures.



Thermostat is available with up to 25 feet of tubing

Local bulb thermostat has diameter of 5/8" and sensing leg 3½" long. Unit has standard ½" pipe thread fitting. Diameter of bulb in remote model is approximately 3/16" with 11" length. Mechanism is housed in flanged 3 x 3 x 6" case.

(Thermostats are a product of Fenwal, Inc., Dept. CP, 243 Pleasant St., Ashland, Mass. . . . or for more information check 4203, pages 2 and 3.)

Gives details on beater roll pressure controller

Systems for measuring and controlling beater roll pressure are outlined in eight-page bulletin.

Bul 98113 is issued by Taylor Instrument Companies, Dept. CP, 95 Ames St., Rochester 1, N. Y. When inquiring specify CP 4204, pages 2 and 3.

Get faster quality control reporting with TelAutograph* Instan-Form* TELESCRIBERS!

"Handwritten communications system"

Instant transmission of handwritten communications means swifter, surer reporting of the results of "spot" inspections from Incoming Inspection to the Quality Control Laboratory, and between Laboratory and Processing. With an "Instan-Form" telescriber system, reports and analyses, releases and instructions, reach their destinations as they *are being written!*

- Incoming materials are approved and moved on to processing points without delay!
- When a laboratory analysis calls for a change in Processing, operations can be stopped instantly – changes in instructions relayed and received immediately!
- Accurate instructions, relayed and received on "Instan-Forms", save time and cut costs by reducing wastes in labor and materials!
- Every message arrives in the sender's handwriting. Your individually-designed "Instan-Form" is a permanent record, no chance of verbal misunderstanding or copying error!

Speed and accuracy with TelAutograph's Telescriber System can sharpen control and lower costs in your operation as it is doing on high-grade mass production chemical lines of all kinds.

The Instan-Form

The Instan-Form Telescriber

*TM Reg. U.S. Pat. Off.

TelAutograph CORPORATION

Dept. CP-412, 16 West 61st Street, New York 23, N. Y.

☐ Please send me information on TelAutograph Telescriber systems as used in manufacturing plants.

☐ Please have systems analyst call.

Name_____

Street_____

City_____ State_____

Company_____

When inquiring check CP 4205 on handy form, pgs. 2-3

Analyzes oxygen in gas, liquid streams . . .

uses principle of color change in ammoniacal Cu Cl

Uses: For low range measurement of oxygen in gaseous or liquid streams.

Features: Full scale deflection of 50 ppm of oxygen may be obtained by instrument.

Description: Gas sample containing traces of oxygen is bubbled into aqueous solution of cuprous ammonium chloride. Presence of oxygen forms cupric ions which impart a blue color to solution. Transmitted light through solution is measured by two photometers.

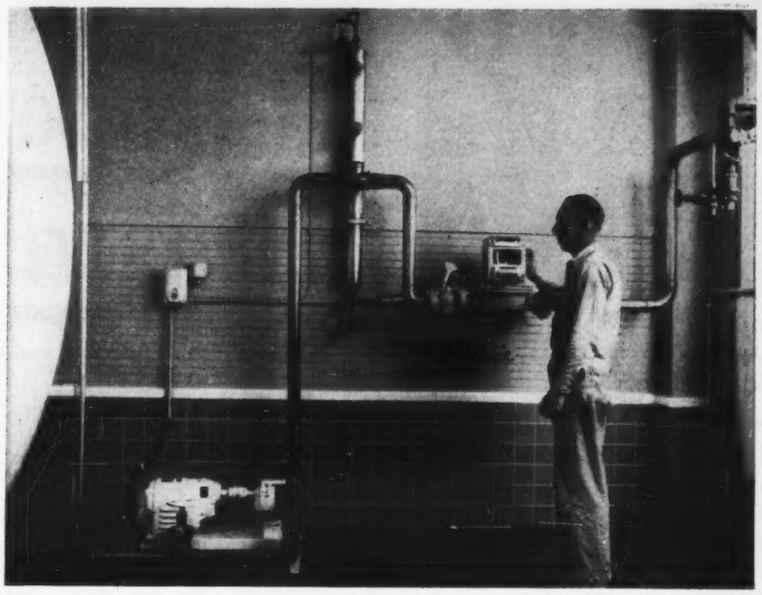
Equipment available with analyzer includes self-supporting panel, single point continuous indicator and recorder, circular chart recorder, and flow chain cabinet with plexiglas window. Circuit breaker and pump are explosion-proof.

(Oxygen analyzer is a product of Davis Instrument Div., Davis Emergency Equipment Co., Dept. CP, 47 Halleck St., Newark 4, N. J. . . . or for more information reader may simply check CP 4206 on the convenient Reader Service slip between pages 2 and 3.)

Explains design, theory of mass spectrometers

Bulletin, illustrated in two colors, explains principles of mass spectrometry. Bulletin also covers process monitoring and control with instrument. Performance characteristics, specifications, and standard features of mass spectrometer are listed in easy-to-read tables.

Bul CEC-1824A is issued by Consolidated Engineering Corp., Dept. CP, 300 N. Sierra Madre Villa, Pasadena 15, Calif. When inquiring reader may simply specify CP 4207 on handy form, pages 2 and 3.



Simple Metering System Boosts Trend to Liquids For Lower Materials Handling Costs

Many ingredients can be handled more economically, with closer formula control, by converting from bulk solids to liquids.

Liquid sugar, for example. It's delivered by tank truck to a simple storage and pumping system in your plant. Put a Neptune Auto-Stop meter at each mixer or kettle and you literally have "push-button control." You just push buttons on the meter to set the quantity, open the valve, and the Auto-Stop shuts off *automatically* . . . "on the nose."

You make these savings: (1) Fewer rejected batches; (2) no heavy bags to lug, no scale weighing; (3) no sifting or spills, hence fewer rodent problems; (4) save valuable storage space by placing tanks in cellars or on roofs; (5) cut hidden losses, get easier inventory figures.

Neptune meters now handle more than 150 different liquids. Capacities from 2 to 1000 gpm., bronze construction. Registers range from simple counters to electrical switch controls for pumps, valves, agitators. Write or phone for details.

NEPTUNE METER COMPANY
19 West 50th Street • New York 20, N. Y.

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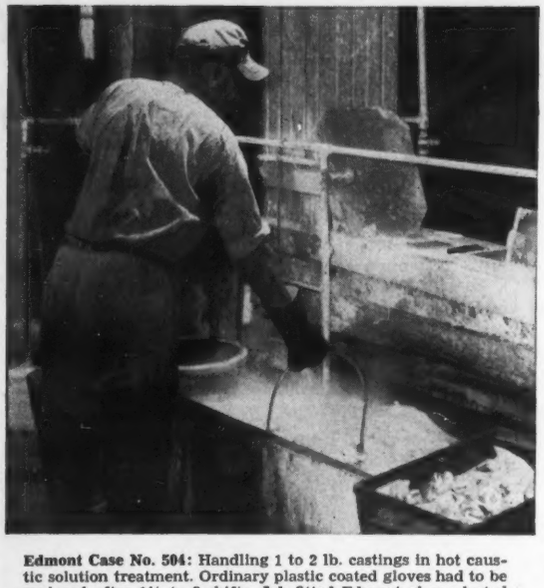
Ask for Bulletin 566-T P

When inquiring check CP 4208 on handy form, pgs. 2-3



Edmont Case No. 504: Handling 1 to 2 lb. castings in hot caustic solution treatment. Ordinary plastic coated gloves had to be replaced after 1½ to 2 shifts. **Job-fitted** Edmont gloves lasted through 6 shifts — 3 to 4 times longer.

Job-fitted gloves wore 3 times longer

No. 932
Heavy duty Neox coated

In case after case, in all types of industry, Edmont **job-fitted** gloves, made of coated fabric, have widely replaced canvas, leather and unlined rubber gloves. Records prove they give 3 to 10 times longer wear, improve safety and work output. Cost savings of 40% to 70% are usual.

No. 360
Palm coated plastic (Durox)

Edmont Case No. 472: Feeding oily sheet steel into shear, metal furniture plant reports leather palm gloves wore only 4½ hours, were cleaned and re-issued every 1½ hours. Edmont palm coated Monkey Grip gloves lasted 16 hours.

No. 60W
Palm coated rough finish natural rubber

Edmont Case No. 293: Pulling condenser tubes, cotton gloves lasted only one hour. Edmont palm coated Grab-it gloves gave 6 hours service.

Edmont Case No. 531: Handling steel sheets on shearing table. Old-fashioned fabric gloves gave out in 4 hours. Modern **job-fitted** coated gloves lasted 15 hours.

Free Test Offer: Let us help you fit the correct gloves to your jobs. Send a description, on your letterhead, of your operations, materials handled and temperature conditions. Without cost we will recommend and forward samples of gloves, for job-testing. Our laboratory also develops special gloves to meet special conditions.

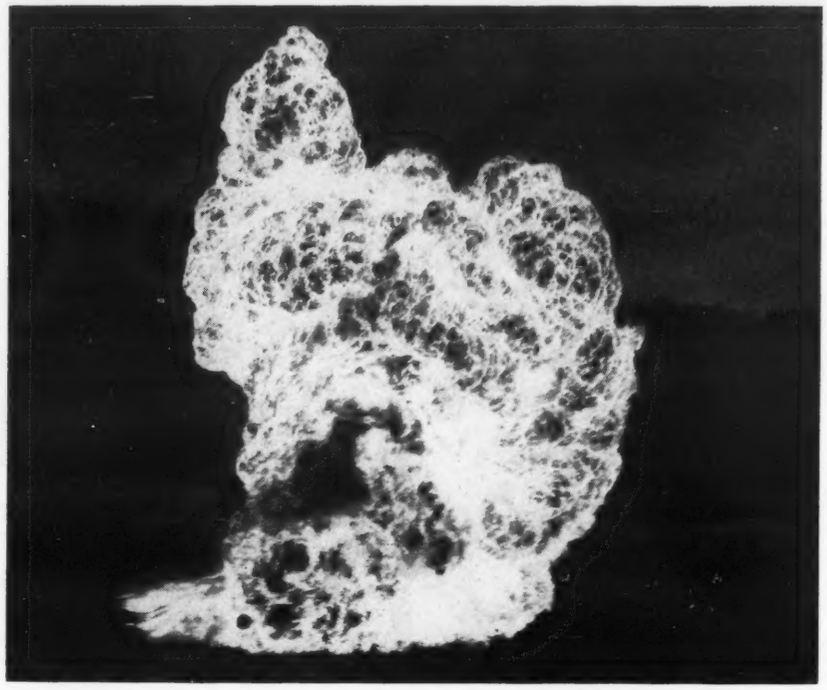
Edmont Manufacturing Co., 1204 Walnut St., Coshocton, Ohio

World's largest maker of coated industrial gloves, available through leading industrial suppliers.

Edmont

Edmont job-fitted gloves

When inquiring check CP 4209 on handy form, pgs. 2-3



Test of a conventional container ended this way after 5 min 55 sec of exposure to fire

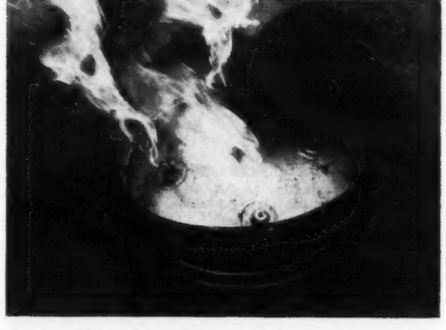
"Drum-within-a-drum" tames ethylene oxide

Insulation plus adequate vent capacity prevents autogenous decomposition

JAMES J. DUGGAN
Superintendent, Process Safety Department
Carbide & Carbon Chemicals Company
with **BRUCE FADER,** Associate Editor

An explosion in Canada in 1946 earned ethylene oxide a bad reputation when several containers were exposed to fire. Shipped at low pressure in sealed containers, it is just another flammable liquid unless it is heated to a point in excess of its critical limits. Liquid ethylene oxide is quite stable. Ethylene oxide vapor, however, is unstable and will decompose with explosive violence when exposed to any ignition source such as an electrical spark or an open flame, and will ignite autogenously at a temperature in excess of 571°C (1060°F.). The pressure generated by such a decomposition can reach as much as 16 times the original pressure on the container at the time the ignition occurred. Such an explosion would be of sufficient violence to set off other containers in the same area.

Through the Fire Research Laboratory, a function of



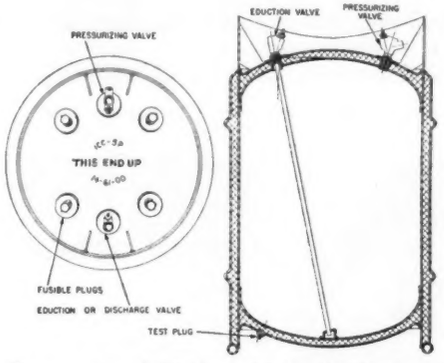
After prolonged exposure, 5-P drum vents contents shown here burning in safe flares

the Process Safety Department of Carbide & Carbon Chemicals Company, a safe container for this chemical compound has been developed. A study of the characteristics of ethylene oxide revealed that there were two factors involved in providing fire-safe shipping containers:

1 — **To prevent high temperature of the container shell or its contents.**

2 — **To prevent excessive internal pressure within the container.**

The container developed (designated ICC-5-P) has a double wall with insulation between. Behaving like a thermos bottle, it drastically reduces heat input to the ethylene oxide in the event of exposure to fire. For the control of excessive pressure, fusible metal plugs were provided in which the fusible metal melts at 157 to 170°F., providing sufficient capacity to maintain a low internal pressure. The escaping gas burns as harmless flares.



Cross section of 5-P drum showing details of construction, insulation, and fusible plug venting devices

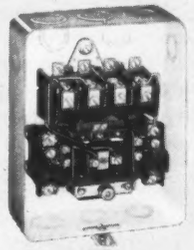
Tests of the 5-P drum were made in a simulated warehouse fire. Only 15 per cent of the total ethylene oxide was lost and there were no explosions, due entirely to the reduction of internal pressure to near atmospheric through actuation of the vent device.

(5-P drum was developed at Fire Research Laboratory, Carbide & Carbon Chemicals Co., a division of Union Carbide & Carbon Corp., Dept. CP, Institute, W. Va.)

Have a safety problem . . .?

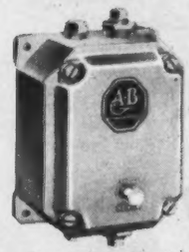
the handy Product Directory (pages 199 to 201 in this issue) is your guide to equipment and ideas which may suit your needs.

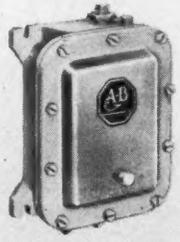
Safe MOTOR CONTROL ENCLOSURES ...FOR EVERY APPLICATION!


General Purpose with cover off

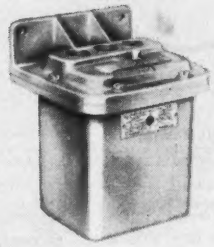
Watertight NEMA 4

Dust-tight NEMA 5


Hazardous Dust NEMA 9


Hazardous Gas NEMA 7

Corrosion-proof NEMA 11


Corrosive Hazardous Gas NEMA 8

General Purpose NEMA 1

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It pays out . . . in safer operation, in greater production, fewer shutdowns, and in lower maintenance . . . to use the correct enclosure for each motor starter installation.

Allen-Bradley Solenoid Motor Starters and enclosures are a moneysaving combination, since the double break, silver alloy contacts require no maintenance. Furthermore, Allen-Bradley starters have only ONE moving part . . . therefore, virtually no chance to go wrong. Thus, inspection only at rare intervals is necessary.

Finally, generous wiring space in all types of enclosures reduces installation time.

Call your nearest Allen-Bradley sales engineer for his control and enclosure recommendations. Also, make certain that you have the 120-page Allen-Bradley "Handy" Catalog—where it is handy! Send for a copy, today.

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ALLEN-BRADLEY

QUALITY MOTOR CONTROLS

ALLEN-BRADLEY TROUBLE FREE MOTOR CONTROLS FOR ALL INDUSTRIES

When inquiring check CP 4211 on handy form, pgs. 2-3

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BIRMINGHAM, ALA.
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BOSTON, MASS.
General Equipment Corporation
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BUFFALO, N. Y.
The Watson Company
1443 Main Street

CHICAGO, ILL.
Universal Safety Equipment Co.
5115 Diversey

CINCINNATI, OHIO
Williams & Co., Inc.
3231 Fredonia Avenue

CLEVELAND, OHIO
Williams & Co., Inc.
3700 Perkins Avenue

COLUMBUS, OHIO
Williams & Co., Inc.
851 Williams Avenue

DALLAS, TEXAS
Guardian Safety Equipment Co.
900 Jefferson Tower Bldg.

DETROIT, MICH.
Averill Equipment Company
19225 Conant Avenue

EAST ORANGE, N. J.
Guardian Safety Equipment Co.
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HOUSTON, TEXAS
Guardian Safety Equipment Co.
1915 A Westheimer

INDIANAPOLIS, IND.
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KANSAS CITY, MO.
Safety, Incorporated
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KNOXVILLE, TENN.
Safety Equipment Distributing Co.
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LITTLE ROCK, ARK.
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Universal Safety Equipment Co.
116 S. Garfield

PHILADELPHIA, PA.
Guardian Safety Equipment Co.
214 S. 45th Street

PITTSBURGH, PA.
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ST. LOUIS, MO.
Safety, Inc.
2608 Olive Street

ST. PAUL, MINN.
Continental Safety Equipment, Inc.
1551 Selby Ave.

SALT LAKE CITY, UTAH
Universal Fire & Safety
Equipment Co., Box 1587

SAN FRANCISCO, CALIF.
Guardian Safety Equipment Co.
50 Hawthorne Street

SPOKANE, WASH.
Spokane Safety Appliances
W. 314 Pacific Ave.

TOLEDO, OHIO
Williams & Co., Inc.
650 E. Woodruff Avenue

TULSA, OKLA.
Guardian Safety Equipment Co.
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WICHITA, KANS.
Guardian Safety Equipment Co.
723 S. Broadway

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Sullivan—95

MONTREAL, CANADA
The Butler Optical Company, Ltd.
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CHICAGO EYE SHIELD COMPANY
2316 Warren Boulevard, Chicago 12, Illinois

CESCO FOR SAFETY

When inquiring check CP 4212 on handy form, pgs. 2-3

Temperatures of 2500°F withstood by suit weighing 10 lb

Lightweight protective suits are made of special flame resistant fabrics that have been fused with metallic layers and topped with aluminum foil.

Leggings, gloves, boots, and hood (with heat- and flame-resistant 180 degree lenses) are all made of same highly reflective aluminum construction. Weight of unit is just 10 lb and no special underclothing or additional protective equipment is needed.

Hoods permit use of breathing equipment when needed. Temperature inside suit never rises above normal body temperature.

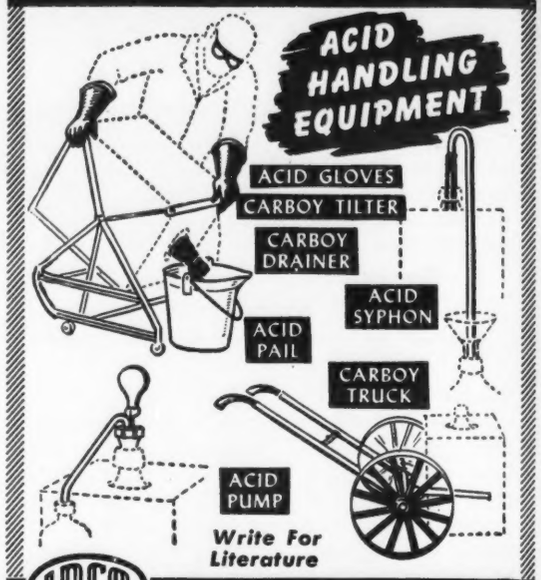
(Fyre-Armor suits are a product of Far-Ex Corp., Dept. CP, 75 West St., New York . . . or check CP 4213, pages 2 and 3.)

Pictures, describes safety cans

Laboratory cans, plunger cans, and oily waste cans for storage and disposal of flammable materials are described.

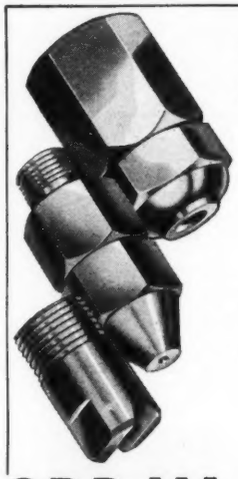
Bul 157 is issued by Gardner Laboratory, Inc., Dept. CP, 4723 Elm St., Bethesda 14, Md. Specify CP 4214, pages 2 and 3.

SAFETY EQUIPMENT FOR ALL INDUSTRIES



IPCO *Safety Equipment for all Industries*
INDUSTRIAL PRODUCTS COMPANY
2834 N. FOURTH STREET • PHILADELPHIA 33, PA.

When inquiring check CP 4215 on handy form, pgs. 2-3



to whom it may concern:

If you'd like to try another and new approach to improving production where spraying is involved. . . may we suggest you consider* Spraying Systems Co.

SPRAY NOZZLES

as a first step . . . WRITE for the incomparable reference Catalog No. 24

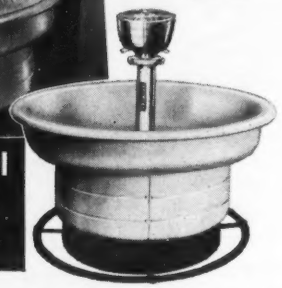
SPRAYING SYSTEMS CO.
3216 Randolph Street Bellwood, Illinois

**Many thousand industrial and chemical companies who are now Spraying Systems customers, once did this and are very glad they did.*

When inquiring check CP 4216 on handy form, pgs. 2-3

Easily kept spotlessly clean.

Made in full-circle and semi-circle (wall type) models finished in white or forest green acid-resisting vitreous enamel.



Vitreous Enamel BRADLEYS are lighter

• Vitreous enamel Bradley Washfountains are selected often because they are lighter than precast stone or marble models, the bowl being a one-piece pressing of deep-drawing steel. They have all other Bradley features,—central spray-head, foot-control, low installation and maintenance cost. For full details, write for Catalog 5204.

BRADLEY WASHFOUNTAIN CO.
2231 W. Michigan Street
Milwaukee 1, Wisconsin

BRADLEY washfountains

Distributed Through Plumbing Wholesalers

When inquiring check CP 4217 on handy form, pgs. 2-3

Now! for greater safety

New Safety GRIP-STRUT stair treads custom made to your exact size . . . Here for the first time is a really SAFE stair or ladder step, combining the proven features of Safety GRIP-STRUT material with a double locked carrier plate to provide additional safety over present types.

Made to your own individual size at the factory, the cost is amazingly low . . . you can buy a standard 18" stair tread in lots of 50 for $2.40 each. Prices proportionately lower in greater quantities.

Distributors in all principal cities. Consult your classified telephone directory.

GRIP-STRUT division
The Globe Company
Manufacturers since 1914
4006 S. Princeton Ave. • Chicago 9, Illinois

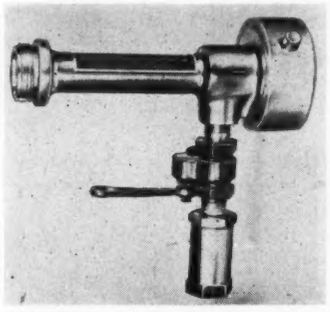
When inquiring check CP 4218 on handy form, pgs. 2-3

Same equipment handles all kinds of fires

Uses: For drafting 6% Foamite Airfoam (or 3% by use of an adapter) and wetter water. It attaches to 2½" discharge gate of a pumper and quickly produces Airfoam for extinguishing gasoline, oil, or grease fires.

Features: Producing up to 600 gallons of Airfoam per minute, proportioner frees one fireman for other duties as the pumper operator handles liquid containers in any operation.

Description: Wetter water metering device is separate part of unit and has two positions. One is for drafting wetter water solution for ordinary combustible fires, the other for drafting Airfoam liquid for flammable liquid fires.



Switches from Airfoam to wetter water in few seconds

(Proportioner is a product of the American-LaFrance-Foamite Corp., Dept. CP, 101 LaFrance St., Elmira, N. Y. Check CP 4219, pgs. 2 & 3.)

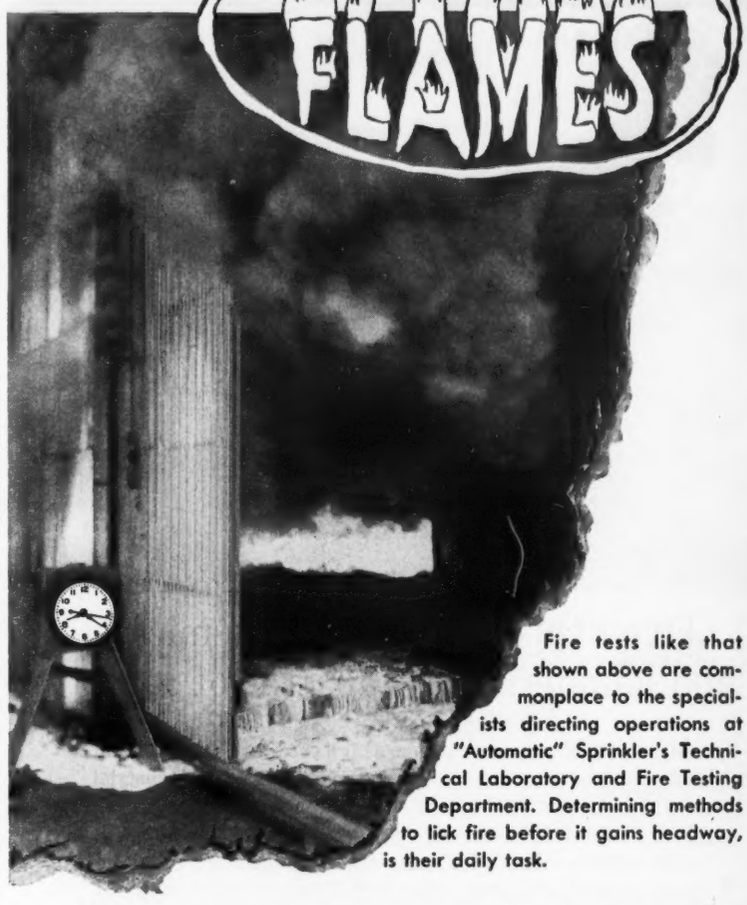
Details safe handling of chlorine

Details on methods of shipment, instructions for handling and storage of chlorine are covered in 26-page, two-color brochure.

"Chlorine Safe Handling" brochure is issued by Columbia-Southern Chemical Corp., Dept. CP, 632 Fort Duquesne Blvd., Pittsburgh 22, Pa. Specify CP 4220, pages 2 and 3.

Killing FIRE Through Research

OPERATION FLAMES



Fire tests like that shown above are commonplace to the specialists directing operations at "Automatic" Sprinkler's Technical Laboratory and Fire Testing Department. Determining methods to lick fire before it gains headway, is their daily task.

These engineers design fire protection BEST-BY-TEST for severely hazardous manufacturing operations. All types of extinguishing mediums are at their disposal—every known method of fire detection is employed.

The services of this research phase of our business are available to our customers and potential customers. It's a service second to none in our field—lends credence to the motto . . . "Automatic" Sprinkler—FIRST IN FIRE PROTECTION!

"Automatic" Sprinkler
CORPORATION OF AMERICA
YOUNGSTOWN, OHIO

Offices in Principal Cities of North and South America

When inquiring check CP 4221 on handy form, pgs. 2-3

NO MAGIC to work clothing that's economical in use...

DYNEL'S resistance to chemicals and laundering is a matter of FACT!

THE FACT IS: thanks to DYNEL'S high chemical resistance and extra-long laundry life, it has outworn other fibers in industrial clothing by as much as 10 to 1.

Chemical plants find that DYNEL laboratory coats mean substantial savings in inventory and replacement costs. At one plant in the South, after using 1500 DYNEL lab coats daily for 9 months, there were *no* replacements due to wear and tear! Employees wore DYNEL coats longer because they didn't show dirt readily, weren't damaged by acid or caustic solutions. Top laundries, too, are using DYNEL for their industrial clothing rental services because of DYNEL'S long laundry life.

CUT YOUR CLOTHING COSTS WITH DYNEL:

1. **Unaffected by most chemicals.**
2. **Strong—wet or dry.**
3. **High abrasion resistance.**
4. **Washable—won't shrink or stretch.**
5. **Long laundry life.**
6. **Will not support combustion.**
7. **May be cleaned or decontaminated in acids without harm.**
8. **Moth and mildew proof.**

For a list of manufacturers of DYNEL industrial clothing, and data on the chemical resistance of DYNEL, write:

Textile Fibers Department, Carbide and Carbon Chemicals Company
A Division of Union Carbide and Carbon Corporation UCC 30 E. 42nd Street, New York 17, N. Y

ECONOMY-IN-USE will tell... it's DYNEL

UNION CARBIDE'S NEW SCIENCE FIBER

When inquiring check CP 4222 on handy form, pgs. 2-3

SAFETY

Prevents vibration damage to cooling towers

Safety switch prevents damage resulting from blade breakage and equilibrium loss on fans. Sensitive mercury switch automatically stops fan's electric current.

Fan can't be started again, except by resetting switch. Switch is operated from cooling tower deck

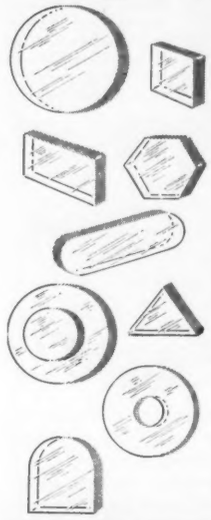
Switch detects cooling tower fan vibration

without entering fan stack. Its fixed position on the gear supporting beam is aligned for instant reaction to any fan or driving shaft irregularity.

(Dual-Safety Switch is a product of the Santa Fe Tank & Tower Co., Inc., Dept. CP, 5401 S. Boyle Ave., Los Angeles 58, Calif. . . . check CP 4223, pages 2 and 3.)

Cartoon above is reproduction of National Safety Council poster 0259-B. For information on safety posters write National Safety Council, Dept. CP, 425 N. Michigan Ave., Chicago 11, Ill.

Call SWIFT for SIGHT GLASSES



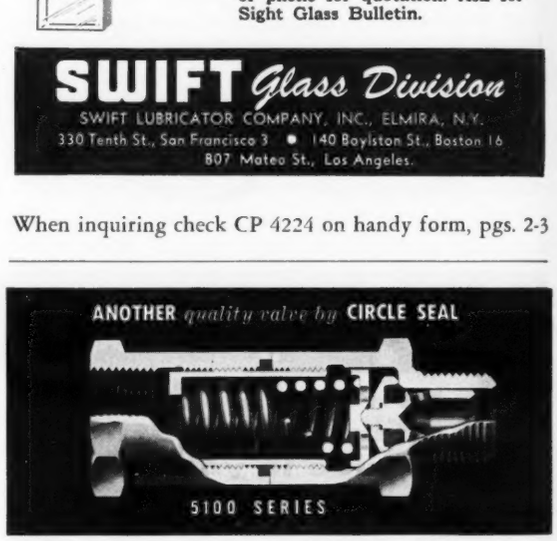
precision-ground in perfectly true circles

Let us supply you with Perfectly True Circles precision-ground from heat-resistant Pyrex Polished Plate Glass . . . used by major chemical companies from coast to coast. Resist clouding, pitting, chemicals (except HF and strong hot caustic solutions).

We can deliver immediately specially cut round, square, rectangle or odd-shaped Sight Glasses in 8 thicknesses (⅛" to 1"), sizes up to 24" x 60". Write, wire or phone for quotation. Ask for Sight Glass Bulletin.

SWIFT Glass Division
SWIFT LUBRICATOR COMPANY, INC., ELMIRA, N.Y.
330 Tenth St., San Francisco 3 • 140 Boylston St., Boston 16
807 Mateo St., Los Angeles.

When inquiring check CP 4224 on handy form, pgs. 2-3



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- In-line design
- Adjustability that can't be tampered with
- Excellent flow characteristics
- Precise operating reliability
- Suitable for almost any gas or liquid

Send for information today..... ☐

CIRCLE SEAL *precision valves*

Representatives in Principal Cities.

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When inquiring check CP 4225 on handy form, pgs. 2-3

Eliminate
Costly and Dangerous
WATER HAMMER
in your piping system *with*

WILLIAMS-HAGER
FLANGED
Silent
CHECK VALVES

Yes . . . compact, durable and dependable Williams-Hager check valves will eliminate expensive and troublesome noise in *your* piping system. Available for standard pipe sizes from 1" to 20", they operate with maximum efficiency in horizontal, vertical or angular. Send coupon for complete details.

MAIL THIS COUPON TODAY

THE WILLIAMS GAUGE CO., INC. (CP1254)
3013 Pennsylvania Avenue
Pittsburgh 33, Pa.

Please send a copy of Bulletin WH-851 on "Water Hammer, Cause, Effect and Control in Piping Systems."

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COMPANY_____
ADDRESS_____
CITY_____ ZONE____ STATE_____

CHECK VALVES
THE WILLIAMS GAUGE CO., INC.
3013 Pennsylvania Ave., Pittsburgh 33, Pa.

When inquiring check CP 4226 on handy form, pgs. 2-3

Eliminates need for dilution of gases in combustible gas detection . . .

instrument incorporates two different principles in pinpointing gas leaks in underground pipes

Instrument designed to locate gas leaks from underground pipe lines has dual function. It incorporates two separate principles of combustible gas detection and can analyze accurately complete ranges of gas concentrations, below and above explosive limits. In the past, it has been necessary to dilute some concentrations too "rich" in gas for reading on available indicators.

For measurement of gas concentrations below lower explosive limit, instrument utilizes the combustion principle — gas in sample is burned on detector

Trace concentration of combustible gas in bar holes are detected and measured with instrument which utilizes both combustion principle and thermal conductivity method — without dilution technique

filament which forms part of a balanced electrical circuit. Unbalance, as shown on meter, is in direct proportion to concentration of gas present in the sample.

To measure higher concentrations, too "rich" with gas to burn, thermal conductivity principle is employed. This involves use of another filament which also forms part of a balanced electrical circuit. Higher heat conduction rate of gas surrounding filament serves as index of concentration percentage in the measurement.

(*Continued on page* 141)

Scott AIR-PAK

. . . breathe cool, fresh AIR — not oxygen!

Don't waste valuable minutes at the scene of the emergency for your breathing equipment to start generating. Use the Scott AIR-PAK and you are ready to go in seconds. The AIR-PAK supplies all the cool, fresh air you need. You can go directly to the trouble source without concern for the concentration of gas or vapor because you are absolutely independent of surrounding atmosphere with the AIR-PAK.

No complicated training or practice is necessary. Cool air operation prevents fogging. Using air instead of oxygen inspires confidence in the most inflammable atmosphere. Clear, convenient gage assures dependable check on air supply.

If you would like more information on the world's safest self-contained breathing equipment write today!

SINCE 1932 Scott SAFETY-FOR SURE

SAFETY EQUIPMENT DIVISION
SCOTT AVIATION CORP.
242 ERIE STREET LANCASTER, N. Y.
Canada: Safety Supply Co., Toronto — Branches in principal cities
Export: Southern Oxygen Co., 15 West 57th Street, New York 19, New York

When inquiring check CP 4227 on handy form, pgs. 2-3

TAKE EVERY PRECAUTION . . .

TO SAVE PRICELESS VISION!

The HAWS Eye-Wash Fountain makes it possible for the worker himself to safely, easily wash injurious chemicals and foreign matter from the eyes before medical aid can be at hand. Has the potentiality of saving vision, reducing insurance claims.

AND to *prevent* dangerous and expensive eye accidents, encourage workers to wear goggles and plastic face shields by installing a HAWS Goggle-Wash Fountain—eliminates one of workers' main objections to wearing these safety devices.

"Precaution" is really the cheapest thing you can buy!
HAWS Safety Equipment costs only a few cents per worker.
Write for literature today!

HAWS DRINKING FAUCET CO.
1443 FOURTH STREET (Since 1909) BERKELEY 10, CALIFORNIA

When inquiring check CP 4228 on handy form, pgs. 2-3

OCECO Internal TANK VALVES

prevent "run-offs" from storage tanks

● Valve is held open with a lever, and a fusible link that melts when exposed to grass fires, etc., permitting a spring to close the valve tightly, cutting off the flow. Fabricated steel construction. Free flowing design. Mounts on standard single flange tank nozzle. 3 inch to 18 inch sizes. Write for fully descriptive data sheet.

OCECO TANK FITTINGS
THE JOHNSTON & JENNINGS CO.
division of PETTIBONE MULLIKEN CORP.
4751 West Division St. • Chicago 51, Illinois

When inquiring check CP 4229 on handy form, pgs. 2-3

SAFETY

Revised safety data sheet on butadiene issued

Revised safety data sheet on butadiene covers properties and essential information for safe handling and use. Number of important changes have been made in section relating to personal protective equipment and general handling procedures.

Bul SD-55 is available by remitting 25 cents to Manufacturing Chemists' Assoc., Dept. CP, 1625 Eye St., N.W., Washington 6, D.C.

Non-toxic disinfectant sanitizes personal safety equipment

Non-irritating and non-toxic concentrate mixes with water to form effective disinfectant for sanitizing safety glasses, goggles, and respirators.

After sanitizing in solution, articles need not be rinsed, washed off, or wiped dry.

One 6-oz metered bottle of concentrate will make 24 gallons of disinfectant. Concentrate is registered under Section 4 of the Federal Insecticide, Fungicide and Rodenticide Act.

(Cesco Concentrate is a product of Chicago Eye Shield Co., Dept. CP, 2300 Warren Blvd., Chicago 12, Ill. . . . or check CP 4230 on handy form, pages 2 and 3.)

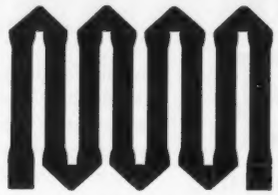
Automatic fire protection in CO_2 system detailed

Illustrated 12-page bulletin gives details on pressure-operated CO_2 fire extinguishing systems. Operational features of the electrically-operated, automatic systems are shown with typical applications and cutaway drawings of equipment.

Bul "Automatic Electric CO_2 Systems" is issued by Walter Kidde & Co., Inc., Dept. CP, Belleville 9, N.J. Check CP 4231, pages 2 and 3.

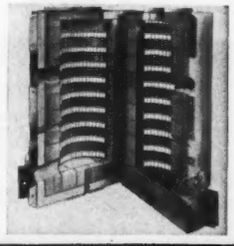
FOR FASTER HEATING AND COOLING
. . . BETTER TEMPERATURE CONTROL

TRENT "FOLDED-and-FORMED" Heating Elements



Exposed ribbon type resistor heating elements out-perform sheath type elements where high-temperature, controlled electrical heat is essential for efficient processing operations. The unique construction of Trent "Folded-and-Formed" ribbon type elements further assure maximum rigidity for long-life and low-cost maintenance *plus* maximum heat transfer and radiation . . . greater radiating surface per square inch of element cross-section than any other type of electrical heating element! You get more controlled heat, faster . . . at lower costs.

Trent "Folded-and-Formed" Heating Elements are available in easily installed Standard 12" x 12" Racks or Custom-built Racks of any size or shape to exacting dimensional specifications . . . for required K.W. at temperatures up to 2000°F.



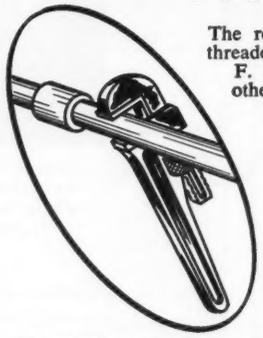
TRENT ENGINEERING SERVICE

Experienced Trent Heating Engineers will analyze your heating requirements to determine the efficient and economical installation for your operations. Consult our Engineering Department if you have a heating problem, or request to see the new Trent "Folded-and-Formed" Heating Element booklet.

TRENT INC.
Electrically Heated Industrial Equipment
247 LEVERINGTON AVE., PHILA. 27, PA.

When inquiring check CP 4232 on handy form, pgs. 2-3

loosen 'em up . . .
with MOLYKOTE® LUBRICANTS



The results of tests made on threaded connections at 1000° F. for 5000 hours (and others at even higher temperatures) are yet *unmatched* by any other lubricant.

Whenever comparison tests are made MOLYKOTE is usually specified for extreme bearing pressure or high temperature applications

MOLYKOTE, Type G. contains a high concentration of molybdenum disulfide, and is unexcelled in

- anti-seizing properties
- low coefficient of friction at extreme bearing pressures
- chemical and thermal stability.

Send for your FREE SAMPLE today!

the ALPHA corporation
STAMFORD, CONN.

When inquiring check CP 4233 on handy form, pgs. 2-3

NEW

$47,000,000.00

LEAK DETECTOR

This foolproof leak-detecting device is guaranteed to locate most of your leaks very quickly. To locate leaks, you merely pipe up the plant, then check each joint for a tight seal. Most leaks will show up on this device at start-up time. Those that are not found at start-up will usually be found as soon as the plant is in operation; vibration will make it easier for you to find the leaks.

This seems like an expensive way to find leaks when you consider that the leaks could be prevented by specifying Swagelok Tube Fittings.

Leaks are expensive. Stop them before they happen. Specify Swagelok. For catalog write Department 412.

Swagelok®

TUBE FITTINGS

BRASS • ALUMINUM • STEEL

STAINLESS STEEL • MONEL

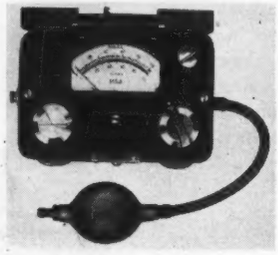
CRAWFORD FITTING CO.

884 E. 140th Street

Cleveland 10, Ohio

When inquiring check CP 4234 on handy form, pgs. 2-3

(*Continued from page* 139)



On-off switch also operates rheostat to adjust zero of both gas detecting and measuring scales

Only one switch is used to change from one range to the other when using instrument. Flashlight dry cell batteries are used for electrical energy. No valves have to be coordinated with switch operation and gas samples, taken into instrument, pass over both filaments in series.

(Gascope is a product of the Mine Safety Appliances Co., Dept. CP, Braddock, Thomas and Meade St., Pittsburgh 8, Pa. . . . or for more information check CP 4235 on handy form, pages 2 and 3.)

Explosion hazard of combustible gases eliminated by compact unit . . .

self-contained gas alarm offers protection for single-point hazardous operations

Uses: To warn of explosion danger in such places as drying ovens, hydrogen-brazing areas, process areas, and chemical laboratories.

Features: Dual alarm point version can be provided which close separate and independent alarm relays at two different concentration levels. Usual settings are 0.2 for low alarm and 0.6 for the high.

Descriptions: Alarm combines all operating functions into 14 x 5¾ x 19½" dust-proof cabinet, designed for surface or flush mounting. Vapor samples are drawn continuously through tubing from point of hazard and the explosibility is shown continuously on indicating meter.

When combustibles reach preset level ranging from 0.1 to 1.0 of the lower explosive limit, internal relay closes the circuit, and alarm is actuated. Unit requires 50 watts and is powered from constant-voltage transformer operating on 115 volt 60 cycle single-phase power. Weight of unit is 55 lb.

(Model SM alarm is a product of Johnson-Williams, Ltd., Dept. CP, 2725 Park Blvd., Palo Alto, Calif. . . . or for more information reader may simply check CP 4236 on handy form, pages 2 and 3.)

For more information on product advertised at right, specify CP 4237 . . . see information request between pages 2 and 3.

HERE'S THE *New* RUPTURE DISC FOR BS&B SAFETY HEADS . . .

. . . ESPECIALLY DESIGNED FOR USE IN LOW PRESSURE APPLICATIONS UNDER SEVERE CORROSIVE CONDITIONS!

For many years the problem of producing a low pressure rupture disc that could withstand prolonged exposure to severe corrosive conditions was a perplexing one. Yet, it was a problem that *had* to be solved, particularly for the Process Industries.

Therefore, it was only natural that BS&B — originator of the Safety Head — should come up with the right answer in the form of a flat type rupture disc whose bursting pressure is controlled by a top metal section, isolated from the corrosive contents of the protected vessel by a sealing membrane of Teflon or Kel-F.

If back pressure is not anticipated, the bottom metal section of the disc is cut open to full relieving capacity (Model 1A). However, if a vacuum support is needed, the bottom metal section is constructed similar to the top section to serve as a vacuum support (Model 1B). Top and bottom sections are spot welded together to give a single compact unit.

Disc Models 1A and 1B are constructed of corrosion-resistant metals such as Inconel, stainless steel, nickel, Hastelloy B and Monel. Either model is available in 2", 3", 4", 6", 8" and 10" sizes. Pressure ratings are from 8 to 100 lbs. Close design tolerances are an inherent feature of this type disc.

If you have a pressure relief problem which you have not been able to solve satisfactorily with the regular pre-bulged type of disc or other types of relief devices, try the new BS&B Model 1A or 1B disc. It fits any standard size BS&B Safety Head flanges you may now have in service. Also available in a complete assembly consisting of inlet and outlet flanges, rupture disc, studs and nuts.

Your BS&B Man will be glad to give you details . . or you may write for descriptive literature and prices.

BS&B Safety Heads

THE "CIRCUIT-BREAKER" OF Pressured Systems

EFFICIENCY OVER 60 YEARS BS&B RELIABILITY

BLACK, SIVALLS & BRYSON, INC.

Safety Head Division, Dept. 2-M12

7500 East 12th Street, Kansas City 26, Mo.

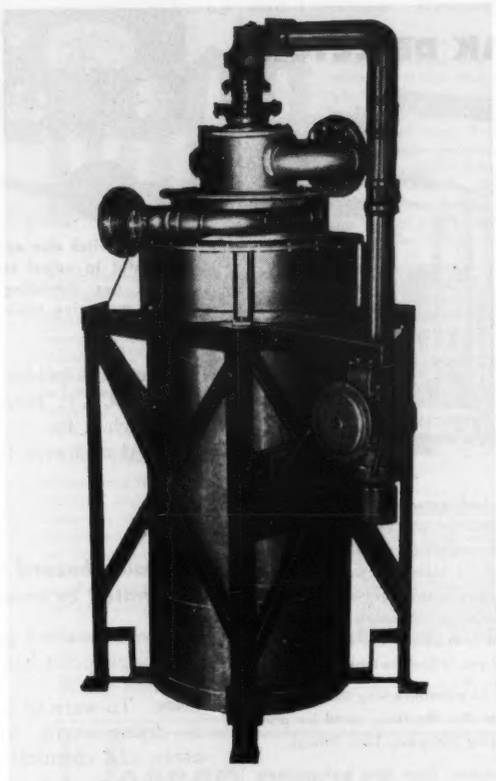
SOLVE YOUR MIXING PROBLEMS

A tremendous variety of fluid mixing needs are ably handled by the complete line of Eastern Mixers. Size and power of mixers are flexible to help solve your problems. For complete information and engineering data, write for Eastern Fluid Mixing Catalogs. Eastern engineers are always available to work out your complex mixing problems with you.

EASTERN INDUSTRIES ★ MIXER DIVISION ★

Eastern INDUSTRIES, INC.
Dept. D, Regent St., Norwalk, Conn.

When inquiring check CP 4238 on handy form, pgs. 2-3



Measuring 3½ x 3½ x 9½ ft, heater has effective exchange surface of 159 sq ft and . . .

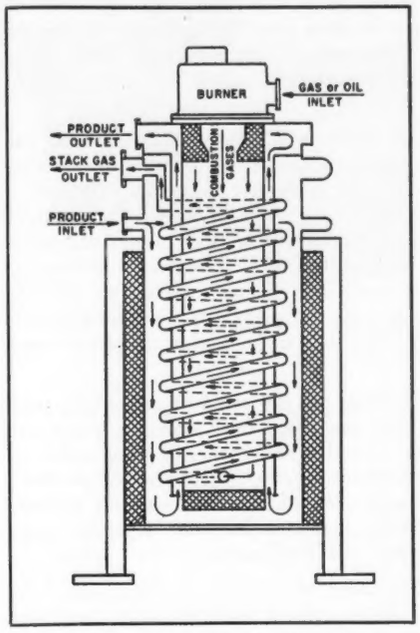
transfers 2½ million Btu per hour

Heated almost entirely by convection, unit has rapid heat-up and response characteristics

Uses: Although currently only being used to heat air, units can also be used for heating other gases. Heaters are available in two basic designs — one for high-pressure heating (up to 1500°F at 300 psi), and the other for low-pressure work (1000°F at 50 psi). Preliminary tests conducted on both high and low-pressure units indicate that they can be used to heat liquids in various chemical operations as well.

Features: Heaters are compact and highly efficient. For example, a typical high-pressure unit is only three and one-half feet square and nine and one-half feet high, but can transfer heat at rate of two and one-half million Btu per hour. Low-pressure unit (about the same size) can transfer 600,000 Btu per hour.

Operating on jet principle, the high-velocity burner in units has a heat release of 10 million Btu per hour per cubic feet of combustion space. Flame length is only six inches and exit velocity ranges from 300 to 500 feet per second at normal operating levels. Burner temperatures can be held to less than 5°F variation, but can be varied hundreds of degrees in matter of minutes. Either gas, light oil, or combination gas-oil can be used as fuel without change in configuration or operating char-



Simplified drawing shows design and operation of low-pressure (Type FT) heater

acteristics. Soot is nil because of complete combustion.

Both designs have rapid heat-up response because heat is transferred almost entirely by convection. These characteristics make units particularly valuable in test facilities where wide changes in load and operating levels must be met quickly.

Description: Thermal types DF (high-pressure) and FT (low-pressure) heaters are basically two-pass, counter-flow units. The passes fit one inside the other and are separated by a baffle. Both passes, in turn, fit inside outer shell of unit. Burner mounts on top of inner pass and is an integral part of the heater.

In type FT (low-pressure) units, material being heated flows down past a series of coiled tubes in outer pass and up annular space between inner core (or tube) and baffle wall. Combustion gases travel down inner core and up coiled tubes in outer pass (see drawing).

(*Continued on next page*)

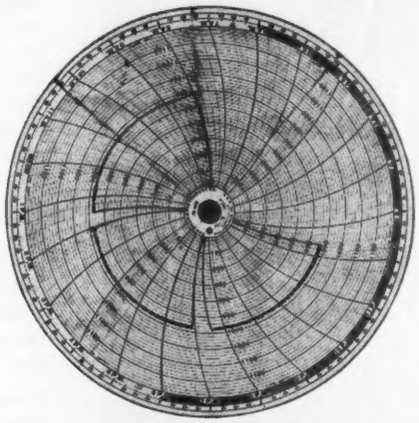
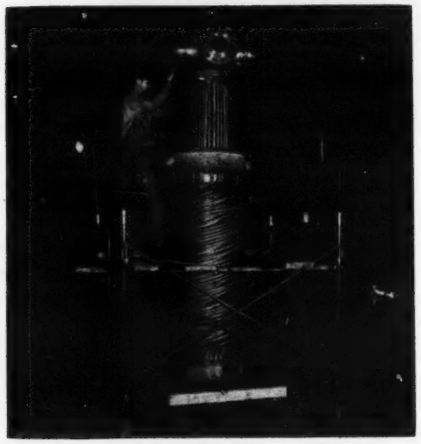


Chart illustrates heater's rapid heat-up and response characteristics

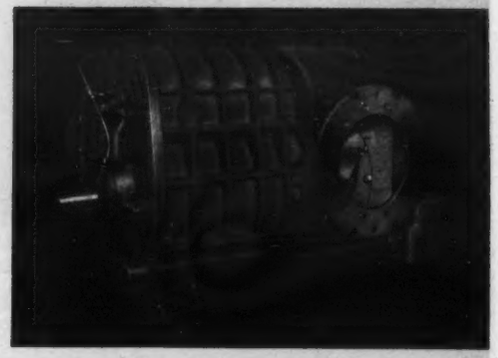


Tubular first and second passes of high-pressure unit (Type DF) being assembled

Operating Data of Some Typical Heaters

Model	FT-275	FT-600	DF-1010	DF-1015	DF-1030	DF-1080*
Rated pressure, psi			300		300	
Outlet temperature, °F			1200		1200	
Tubes, first pass	12	12	11	11	10	26
Tubes, second pass	1	1	32	32	52	80
Total heat transfer area, square feet	28.87	50.16	49.10	61.27	159.30	938.00
Heat transfer, Btu/hr	275,000	600,000	750,000	1,100,000	2,500,000	8,000,000
Heat flux, Btu/hr/sq ft	9,530	11,950	115,270	117,950	115,700	8,555

*First pass uses finned tubes



Moves more gas or air, with less wear...

... and less maintenance and power costs than other blowers of equal weight and size.

You'll find the *Standardaire* Blower offers you a wider range of pressures with a minimum of internal losses, because the *Standardaire* employs a proved principle of compressing gas or air on a modified adiabatic cycle.

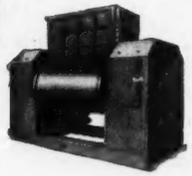
The rotors of the *Standardaire* Blower are accurately machined to very close running tolerances, and provide continuous sealing throughout the entire length of their engagement. Therefore, the high pressure gas or air is confined at the discharge end of the Blower and leakage lines are much shorter than on other types of blower units.

Get all the facts today . . . write

READ STANDARD CORPORATION

BLOWER-STOKER DIVISION
370 Lexington Avenue
New York 17, New York

Read Standard also manufactures a complete line of chemical mixers for laboratory and industrial use. For information write, Read Standard Corp., York, Pennsylvania



When inquiring check CP 4239 on handy form, pgs. 2-3

processing pressures versus operating safety

The trend in processing is moving towards higher temperatures and pressures. With it, the hazards of operating equipment are rapidly increasing.

Each of us—you as a processor, we as manufacturers of equipment—has a share in the responsibility for operating safety.

For fabricators of pressure vessels, the A.S.M.E. Code provides excellent rules and procedures which have, as a fundamental objective, safe operation. Here at Blaw-Knox, they are strictly adhered to, but as a *minimum standard.*

Into your Autoclave-Reactor, we design and build the maximum margin of safety permitted by the limitations of the job. The latest construction materials . . . new methods of stress analysis . . . recent developments in fabricating . . . the latest accepted principles of design—all contribute to operating safety. All are given careful consideration at Blaw-Knox.

Your Blaw-Knox Autoclave-Reactor is twice inspected at each stage of its completion. From initial design to final testing, it is carefully examined first by experienced Blaw-Knox Inspectors. Next, it is throughly re-examined by a fulltime Hartford Insurance Inspector hired to assure you of receiving a vessel which will be insured by any company.

These are important factors to consider when specifying an Autoclave-Reactor. They are the factors that make Blaw-Knox Autoclave-Reactors more reliable. When you buy, be sure to specify Blaw-Knox.

Write for Blaw-Knox Catalog No. 2413

BLAW-KNOX COMPANY

BLAW-KNOX

Blaw-Knox Equipment Division
Process Equipment Department
Pittsburgh 38, Pennsylvania

When inquiring check CP 4240 on handy form, pgs. 2-3

(*Continued from preceding page*)

Type DF (high-pressure) units are designed so material being heated flows down through series of coiled tubes in outer pass and up a series of straight tubes in inner pass. Combustion gases travel down past tubes in inner pass and up past tubes in outer section.

High heat release of burner eliminates need for large combustion chamber and accounts for heater's compactness. The extremely high exit velocities of the combustible gases, coupled with near theoretical flame temperatures available from gases, make possible very high coefficients of convection heat transfer. Burner is controlled by conventional controls and accessory equipment. Usual safety and control devices are easily utilized to make system completely automatic.

Expansion joints are not required on heaters since entire unit is suspended from mounting stand and is free to expand down, through spring action of coiled pass. Operating efficiencies of heaters are about 75%. Pressure drop through units is usually between two and five pounds per square inch, depending upon flow, pressure, and temperature.

Various size units are available in each design. Construction is of welded stainless steel practically throughout, but heaters can be built of any high-temperature corrosion-resistant metal specified.

(Heaters are product of Thermal Research and Engineering Corporation, Dept. CP, Conshohocken, Pa. . . . or for more information reader may simply check CP 4241 on handy form which is located between pages 2 and 3.)

Cooking liquors removed from wood chips, knots at 8000 psi . . .

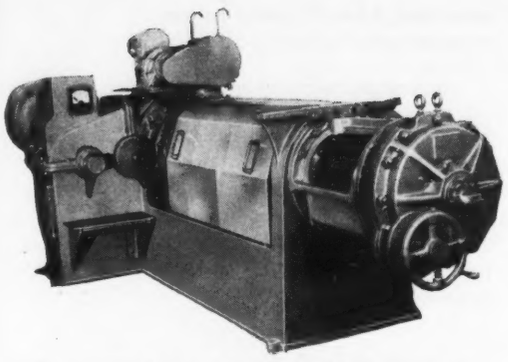
continuous screw press is especially adapted for treating fibrous materials

Uses: Removing fluids or cooking liquors from wood chips, agricultural residues, screenings, knots, bark, and pulp. Also fiberizing material intended for either wet or semi-dry disc mill refining.

Features: Machine has two separately driven screws assembled of interchangeable stellited parts. Press is ruggedly constructed for continuous operation and develops pressures up to 8000 psi.

Description: Model 460 Pressafiner is essentially a continuous screw press especially adapted for treating fibrous materials. It applies alternate twisting and compression forces on material inside a slotted cage assembly where drainage area can be controlled.

Machine is equipped with 100-hp motor. Separately driven screws turn at different speeds — one relatively high, the other low. Cage is constructed of

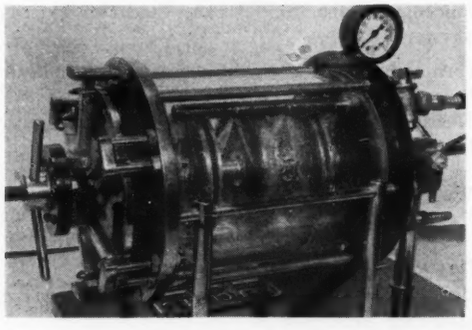


Screw press has two separately driven screws assembled of interchangeable stellited parts

corrosion-resistant parts, including solid stellite cage bars. Drainage spacers are made of stainless steel.

Feed is regulated by metering screw, driven through variable-speed transmission. Permanent magnetic separator in feeder down-spout protects equipment from metal objects. Shipping weight with motor and starter is about 17,500 lb.

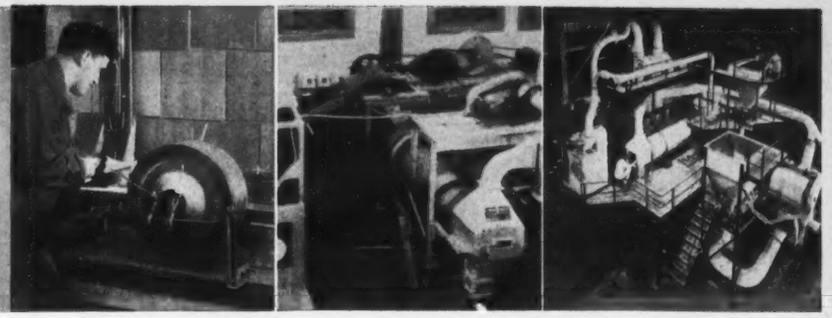
(Pressafiner is product of The Bauer Bros. Company, Dept. CP, 1728 Sheridan Avenue, Springfield, Ohio . . . or for more information reader may simply check CP 4242 on the convenient Reader Service slip which is located between pages 2 and 3.)



All-plastic filter permits manufacturers not only to determine performance of filter for operation they are testing, but also enables them to determine reaction of three plastics to corrosive action of their materials. Unit has one-half foot capacity. Leaves are available made of acrylic, glass-reinforced polyester, and polyvinyl chloride. Polyester model can handle liquids up to 300°F.

Filter is product of Hercules Filter Corporation, Dept. CP, Ethyl Avenue, Hawthorne, N. J. . . . or for more information reader may simply check CP 4243 on the convenient Reader Service slip which is located between pages two and three.

Miniature, reduced-scale and full-scale equipment at Link-Belt laboratories can test-run a pound or a ton of your material



We'll tell you in advance the best drying, cooling or roasting process!

You are invited to utilize LINK-BELT's complete research and testing facilities with no obligation

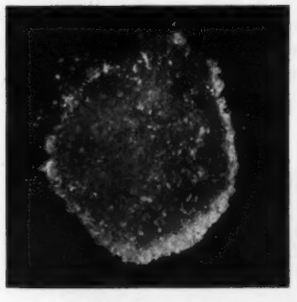
THERE'S no guesswork when Link-Belt helps you establish a new process. In fact, you don't have to undertake any construction until you're *sure* of the exact methods necessary to produce the desired material at a marketable cost.

Here's how it works . . .

Simply arrange to ship a sample of your material to Link-Belt. Whether it's a pound or a carload, Link-Belt has the laboratory facilities to work out procedures *in advance* that can be duplicated in your own plant. Or, if shipping the material is not feasible, Link-Belt will furnish you equipment for a pilot operation right at the site.

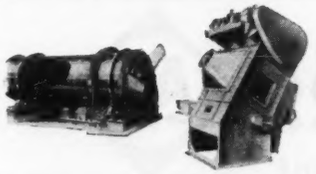
This plan has been utilized by hundreds of processors. It's the no-risk, no-obligation program that has helped Link-Belt place more than 600 dryers in service all over the world. More than 100 different materials are now profitably dried, cooled or roasted by Link-Belt equipment.

If you're planning a change in your processing, *don't gamble!* Ask your Link-Belt representative for full information on this proved service. And be sure he gives you informative literature on the wide range of Link-Belt processing and materials handling equipment.



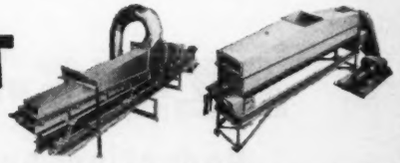
From filter cake to crystals . . .

To produce a sparkling, discreet particle, this wet filter cake has been processed by a Link-Belt Roto-Louvre Dryer, cutting water content from 5% to 0.5%. The Link-Belt laboratories can show you how you can economically change the size, shape or consistency of materials . . . blend, compound or convert them to desired chemical composition.



LINK-BELT

DRYERS • COOLERS • ROASTERS



LINK-BELT COMPANY: Executive Offices, 307 N. Michigan Ave., Chicago 1. To Serve Industry There Are Link-Belt Plants and Sales Offices in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World. 13.587

When inquiring check CP 4244 on handy form, pages 2-3

STYLE N
ROLLER MILL

3-STAGE GRINDING

prevents excessive shattering

THE ALLIS-CHALMERS three stage roller mill increases yield by minimizing fines. Each progressively finer grinding is extremely gentle. There is no excessive shattering . . . no size-destroying impact. Granulations are uniform. The entire mill output is ready for further processing. Elimination of fines reduces costly reprocessing.

To meet the varying requirements of the chemical industry, Allis-Chalmers roller mills are also made in one pair and two pair high. All are of the single-flow type. Two and three pair high mills are used when no separation is necessary between reductions. Roller mills are available with rolls of 9 and 10 inch diameters in 18 to 42 inch lengths. For complete information, see your nearby A-C representative or write Allis-Chalmers, Milwaukee 1, Wis.

A-4214

FLAKING MILL

Pre-mill flaking is one of the many adaptations of Allis-Chalmers equipment and engineering in the chemical industry. By compacting your mill feed into broad surfaced flakes, the Allis-Chalmers flaking mill speeds subsequent grinding operations *two to four* times. Flakes shatter easier than other forms of material.

Circle SIFTER

By utilizing stacked decks, the *Circle* sifter utilizes gyratory motion to provide the screen area of a single deck-type screen requiring *four times* the floor space. Flexible capacity, quick product changeover and positive tensioning are other advantages.

Circle is an Allis-Chalmers trademark.

ALLIS-CHALMERS

Reduction and Separation Equipment

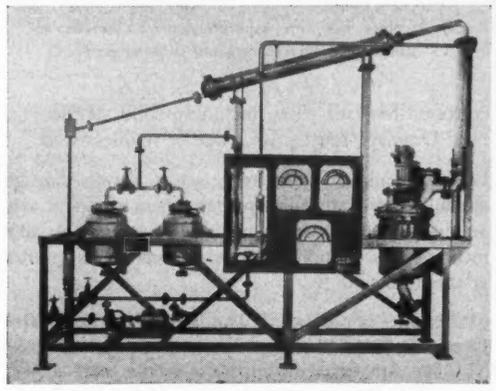
When inquiring check CP 4245 on handy form, pgs. 2-3

Less than 55 sq ft space taken by semi-pilot plant . . .

shipped preassembled or in matched-marked parts

Uses: Obtaining basic design data, determining effects of variables, and evaluating economics of various chemical processes.

Features: Unit is shipped preassembled or in match-marked parts, for simple installation. Equipment requires less than 55 sq ft of floor space, and is only 12 ft high.



Experimental unit has wide range of flexibility

Description: Semi-pilot plant assembly includes following components: 25-gallon jacketed reaction vessel (equipped with an agitator with interchangeable impellers, variable-speed drive, and flush-bottom valve), jacketed column, shell-and-tube condenser, condensate pump, control panel, and two 15-gallon receivers.

(Semi-pilot plant assembly is product of Industrial Process Engineers, Dept. CP, 8 Lister Avenue, Newark 5, N. J. . . . or for more information check CP 4246 on handy form, pages 2 and 3.)

Designed to handle heavy loads — dust collector uses rotary-arm cleaning principle . . .

reverse-air-jet loosens, blows accumulated dust into rectangular receiver tube

Uses: Designed to handle extra-heavy dust loads, as those encountered in pneumatic conveying systems operating under high pressure-vacuum conditions.

Features: Filter medium is cleaned by a continuously rotating vertical blow tube using reverse-air-jet principles. Medium is supported by perforated metal cage, so virtually any strength medium may be used.

Description: Dust-laden air passes into a hous-

So pure it's used to filter food products

SOLKA-FLOC®

99.5% Chemically Pure Cellulose

SOLKA-FLOC is now being used as a filter-aid for a rapidly growing number of food products—proof that SOLKA-FLOC gives the clearest, purest filtrate at high flow rates.

The finely-divided cellulose particles of SOLKA-FLOC form the perfect filter barrier—trapping even the tiniest of suspended solids. SOLKA-FLOC can be handled readily with a knife, will not gouge . . . gives a more stable cake, will not bleed . . . gives longer life to the precoat . . . is chemically inert . . . easily washable . . . can be burned to recover any valuable solids remaining.

To meet your specific requirements SOLKA-FLOC is available in a wide range of grades—enabling you to obtain any desired combination of flow rates and efficiency of filtration.

For better quality foods through better filtration use SOLKA-FLOC. Write to our Technical Service Department BF-12, in Boston, describing your problem in detail.

BROWN

COMPANY, Berlin, New Hampshire

CORPORATION, La Tuque, Quebec

General Sales Offices:

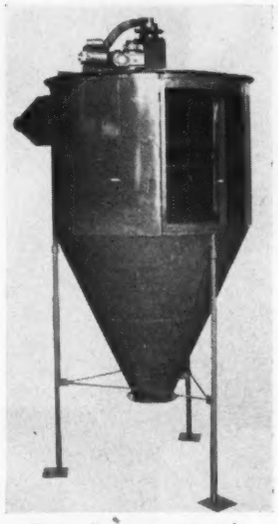
150 Causeway Street, Boston 14, Mass.

Dominion Square Bldg., Montreal, Quebec

SOLKA AND CELLATE PULPS • SOLKA-FLOC • NIBROC PAPERS • NIBROC TOWELS • NIBROC KOWTOWLS NIBROC TOILET TISSUE • BERMICO SEWER PIPE AND CONDUIT • ONCO INSOLES • CHEMICALS

When inquiring check CP 4247 on handy form, pgs. 2-3

ing outside of filter medium and is filtered into an inner filter cylinder. Vertical, slotted, reverse-air-jet blow tube rotates between medium and its supporting cylinder. Accumulated dust and dirt is loosened by the high pressure air and blown into a hollow, rectangular tube which rotates outside filter medium in synchronization with and opposite to the blow tube. Dislodged dust falls through tube into hopper for continuous or intermittent removal.



Dust collector permits wide selection of filter medium material

Operating economy is achieved by using only one electric motor to drive both the rotating blow tube assembly and the positive displacement blower which supplies the cleaning air. Normal operating capacities run from 300 to 10,000 cfm.

(Model R Aeroturn dust collectors are a product of Turner and Haws Engineering Company, Inc., Dept. CP, 87 Gardner Street, Boston, Mass. . . . or for more information check CP 4248 on handy Reader Service slip which is located between pages 2 and 3.)

Improved heavy-duty ribbon mixer has one-piece end plates, oversize shaft

Uses: Blending wet or dry materials.

Features: Units have heavy one-piece end plates, oversize shafts, and anti-friction roller bearings. Shaft is flange-coupled within tub to facilitate removal.

Description: Horizontal ribbon mixers are available in sizes for working volumes from ¼ to 175 cu ft. Totally-enclosed motor, gear reducer, and chain drive are mounted on integral base. Units come equipped with either center or end non-clogging discharge valve. Mixers can be built of any workable alloy. Variety of ribbon designs is available.

(Ribbon mixers are product of The Stevenson Company, Dept. CP, 225 N. Wilkinson St., Dayton, Ohio . . . or for more inforrmation about the Reader Service slip reader may simply check CP 4249 on handy form which is located between pages 2 and 3.)

HOKE

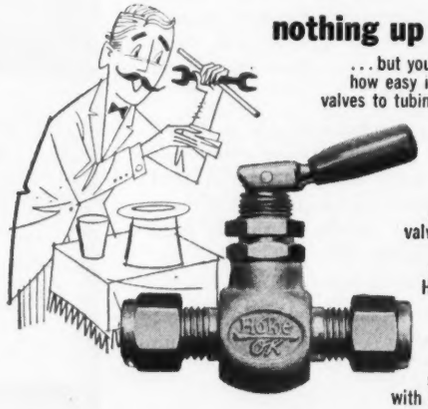
Flow Sheet

Hoke reports on fluid control

we're giving you the needle

to help you control small flow rates easily and accurately. The needle point in a Hoke Metering Valve is just 8° wide and it takes 20 turns of the handle to move the point ⅜ of an inch, the effective throttling length. In addition to this precise control, the Metering Valve has an O-ring stem seal (. . . so tight it'll pass a Helium Leak Test) and is available for instrument panel mounting.

Interested? . . . write for catalog and data sheets.



nothing up our sleeve

. . . but you'll be amazed to see how easy it is to connect Hoke valves to tubing the Swagelok way. No swaging, no sweat, no swearing . . . in fact, it's no trick at all to achieve a permanent valve-to-tube connection with a turn and a quarter of a wrench. Hoke makes precision needle valves, on-off toggle valves, check valves — in brass and stainless — equipped with Swagelok tube ends. Ask for Bulletin SV854.

HOKE

HOKE INCORPORATED

Fluid Control Specialists

When inquiring check CP 4250 on handy form, pgs. 2-3

Multi-diameter rotary dryer featured in bulletin

Rotary dryers, kilns, reactors, coolers, fans, and deodorizing apparatus are covered in 20-page bulletin. Complete with engineering drawings and photographs, literature shows various models available and describes applications. Pictures also show many actual installations.

Featured is a multi-diameter rotary dryer. Consisting of single shell of widely varying diameters, unit is specially designed for drying heat-sensitive materials. Design automatically regulates air and material velocities through unit, and results in greater drying efficiency.

Bul 854 is issued by Edward Renneburg and Sons Company, Dept. CP, 2639 Boston Street, Baltimore 24, Md. When inquiring specify CP 4251 on handy form, pages 2 and 3.

Any number of fractions obtained with flexible pocket arrangement in hydraulic classifier . . .

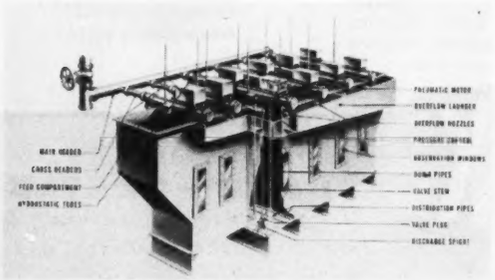
grading chambers may be placed singly in series, or in transverse banks of 2 to 4 abreast

Uses: Sizing and grading solids of eight-mesh and finer size.

Features: Arrangement of pockets offers great flexibility of operation. Compartments may be situated singly in series or in transverse banks of two, three, or four abreast — depending upon feed tonnage and desired number of products.

Maintenance problem is simplified because of removable water distribution pipes. Operating attention is necessary only when major changes occur in feed characteristics. Sizer operates on continuous and automatic basis, producing any number of sharply sized fractions from feed having wide particle size distribution.

Description: Dorrco Jet Sizer consists of number of individual compartments (or pockets) which, with



Drawing illustrates hydraulic classifier for sizing and grading solids of eight mesh and finer

MOVE AHEAD...
"KARBATE" TYPE "C" PUMP
Heavy duty model. 2", 3", 4" discharge sizes. Capacities to 1500 gpm, heads to 120 feet. Catalog Section S-7250.
"KARBATE" HEAT EXCHANGERS
Sizes to 162 square feet from stock; unit areas to 2300 square feet based on standard "Karbate" tube bundles and covers. Catalog Sections S-6740 and S-6840.
"KARBATE" PIPE AND FITTINGS
Light weight, unaffected by most chemicals, immune to thermal shock. Catalog Section S-7000.
"NATIONAL" GRAPHITE COMBUSTION CHAMBER
Installation in Phosphoric Acid Plant. A wide variety of structural sizes and shapes are available in both carbon and graphite.
CASCADE COOLERS —Catalog Section S-6820
HCL COMBUSTION CHAMBERS —Catalog Section S-7530
HCL ABSORBERS —Catalog Section S-7460
STEAM JETS —Catalog Section S-7300

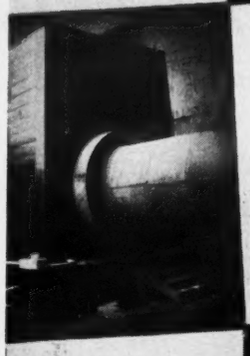
...WITH "KARBATE" BRAND

IMPERVIOUS GRAPHITE PROCESS EQUIPMENT
AND "NATIONAL" CARBON AND GRAPHITE PRODUCTS

A wise move in any economy, and one that's practically dictated by present high costs of maintenance and replacement, is the installation of "Karbate" impervious graphite process equipment and "National" carbon and graphite structural shapes *wherever* corrosion is a factor.

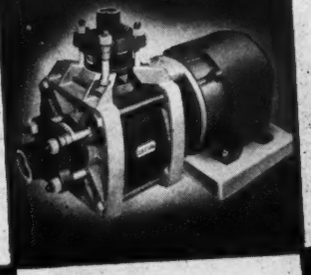
The engineering and technical staffs of National Carbon Company bring to the design and application of their products a record of experience unequalled in the industry. In this diversified line, carbonaceous materials, unique in physical and chemical properties, are combined with proved designs to give you the ruggedness, corrosion resistance and freedom from mechanical difficulty that mean larger, faster return on investment.

Write for literature!



"NATIONAL" CARBON STRUCTURE

for spray cooling of SO_2 containing gases. Factory-machined parts, field-assembled under National Carbon supervision.



"KARBATE" TYPE "F" PUMP

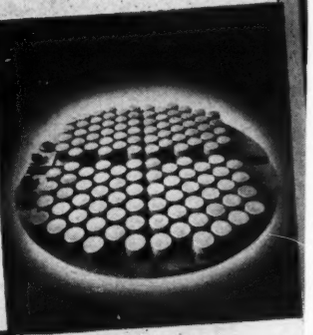
Motor mounted model. 1¼", 2" discharge sizes. Capacities to 200 gpm, heads to 100 feet. Catalog Section S-7250.

ELECTROSTATIC PRECIPITATOR

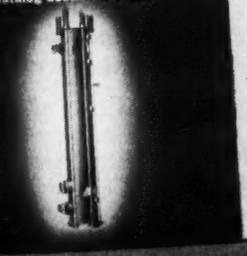
constructed of "National" carbon. Answers unusual chemical and structural requirements.

"NATIONAL" GRAPHITE BUBBLE CAPS AND TRAYS

Many other graphite and "Karbate" impervious graphite tower accessories are available. Catalog Section S-7340.



TOWERS
– Catalog Section S-7350



GRAPHITE ANODES FOR ELECTROLYTIC PROCESSES

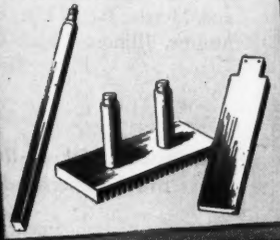
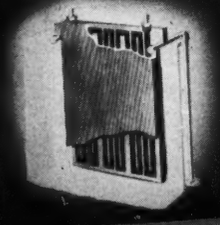


PLATE-TYPE HEAT EXCHANGERS



The terms "Karbate" and "National" are registered trade-marks of Union Carbide and Carbon Corporation

NATIONAL CARBON COMPANY
A Division of Union Carbide and Carbon Corporation
30 East 42nd Street, New York 17, N. Y.

Sales Offices:
Atlanta, Chicago, Dallas, Kansas City, New York, Pittsburgh, San Francisco

In Canada:
Union Carbide Canada Limited, Toronto

When inquiring check CP 4252 on handy form, pgs. 2-3

exception of the first half pocket, are of equal area. Water under hydraulic pressure is distributed from elevated header through system of vertical pipes to four horizontal pipes along bottom of each pocket. Water enters compartments through series of small nozzles in horizontal pipes.

Coarsest particles are removed in first pocket. Upward velocity of water holds particles of narrow size range in suspension in bottom of compartment. Finer material overflows submerged weir to second pocket which operates at slightly reduced water velocity. Similar classification takes place here and in other pockets, each producing a closely graded product. Continuous discharge of sized particles is controlled by automatic, pneumatically-operated system.

Fractions from two or more pockets abreast are combined. In large units, products of two or more banks may be blended. Particles not retained in last pocket overflow to waste or further treatment. Excess water is carried off by launders alongs sides of unit.

Sizer is available with any number of pockets ranging from 1½ to 21½. Capacity of unit is dependent upon material, particle size distribution, and specific gravity.

(Jet sizer is product of The Dorr Company, Dept. CP, Barry Place, Stamford, Conn. . . . or for more information check CP 4253 on handy form, pages 2 and 3.)

Tonnage oxygen plants pictured, discussed

Oxygen plants ranging in capacities from 10 to 1000 tons per day are pictured and described in six-page bulletin. Photographs show actual installations and some of the equipment used in the process. Flow diagram is also included.

Product is made by air fractionation. Because of its favorable properties at low temperatures, extensive use of aluminum is made in the construction of small and medium-size plants.

Bul 0-50 is issued by Dresser-Stacey Company, Stacey Brothers Division, one of the Dresser Industries, Dept. CP, 5535 Vine Street, Cincinnati 16, Ohio. When inquiring specify CP 4254 on handy form, pages 2 and 3.

For a guide to processing ideas . . .

You'll find what you need in the handy Product Directory on pages 199 to 201. All products and processes are listed there.

Koven

WAS MAKING INDIVIDUALIZED CHEMICAL EQUIPMENT

Wave upon wave of land-hungry homesteaders poured into the rich Oklahoma territory, spurred on by the bright promise of opportunity. And back East, where America's growth was reflected in industrial expansion, KOVEN Individualized Equipment was already demonstrating its worth to the chemical industry.

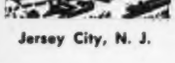
Each dependable KOVEN unit is the result of over 70 years' accumulated engineering skill combined with today's most advanced fabrication methods . . . assures the smooth, efficient output that means higher profits. Follow the lead of top chemical manufacturers throughout the country. End your production problems with KOVEN equipment built to your individual needs. Call or write for a consultation — no obligation.

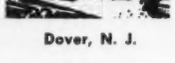
Send for Bulletin #550.

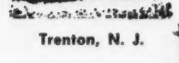
Complete modern facilities including X-ray inspection and stress relieving which insure quality control. KOVEN equipment in all commercial metals and alloys include: Pressure vessels, extractors, mixers, stills, kettles, tanks, chutes, containers, stacks, breechings. Shop and Field Erected Storage Tanks. High Vacuum Testing.

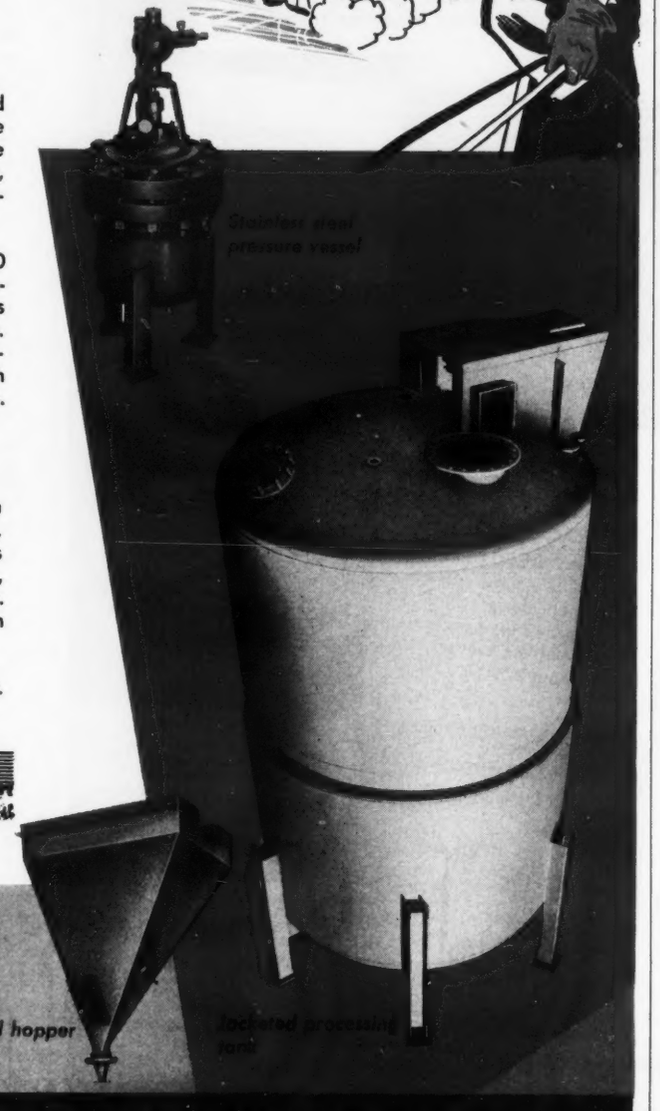
Fabrication to A.S.M.E. Code Par. U-68 a specialty.

Plants:


Jersey City, N. J.


Dover, N. J.


Trenton, N. J.



L. O. KOVEN & BRO., INC.
154-E Ogden Ave., Jersey City 7, N. J.

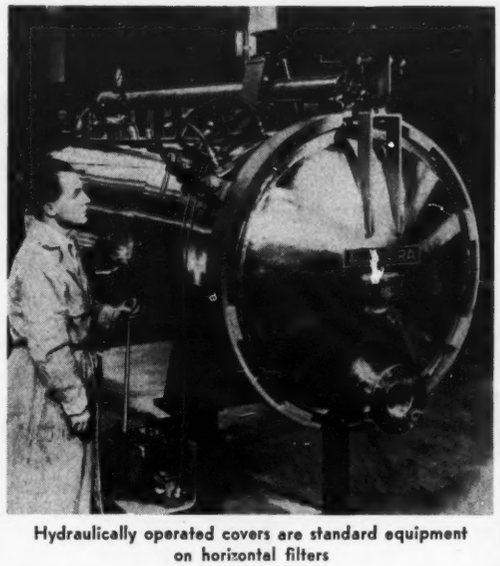
KOVEN FOR INDIVIDUALIZED EQUIPMENT SINCE 1881

When inquiring check CP 4255 on handy form, pgs. 2-3

Convenience, safety featured on hydraulically operated filter cover

Standard equipment on manufacturer's horizontal units (optional on vertical models), hydraulically operated covers provide for quick effortless opening and closing of filters. Uniform pressure exerted by hydraulic system also assures even seating of cover against gasket. Absence of hand wheels and eye bolts reduces maintenance.

Actuation of hydraulic pump transmits pressure to two hydraulic cylinders which in turn rotate locking ring. Resultant pressure of cover against gasket


Hydraulically operated covers are standard equipment on horizontal filters

ring seals filter securely. Reversing motion of locking ring releases cover so that it can be removed.

Closure provides safety feature in that cover cannot be opened until wedges on locking ring and cover clear each other. Pressure is automatically released at first movement of wedges.

(Filters with hydraulically operated covers are product of Niagara Filters Division, American Machine and Metals, Inc., Dept. CP, 48 Thomas Street, East Moline, Illinois. Check CP 4256, pages 2 and 3.)

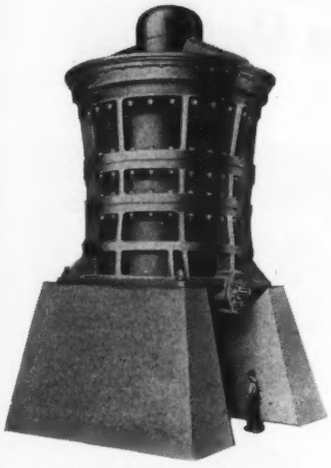
Continuous milk-of-lime process illustrated, described

General arrangement and dimensions of various size systems for continuously preparing milk-of-lime slurry are described in four-page brochure.

Bul 50 is issued by Hardinge Company, Inc., Dept. CP, 240 Arch Street, York, Pa. When inquiring specify CP 4257, pages 2 and 3.

Largest gyratory crusher can process 3500 tons taconite per hr

World's largest gyratory crusher, weighing more than a million and a quarter pounds, will be used in taconite crushing plant at Babbitt,



Crusher's main shaft weighs 205,000 pounds

Minnesota, on Mesabi Range (see page 40 for story on taconite pelletizing). Unit will be capable of processing 3500 tons taconite/hr.

Main shaft, a steel forging about 27 feet long, has maximum diameter of four and one-half feet and weighs 205,000 pounds. Four other major steel castings were required, weighing 822,300 lb.

(Crusher was built by Allis-Chalmers Manufacturing Company, Dept. CP, 1126 South 70th Street, Milwaukee 1, Wisconsin.)

Tells how wire sections improve operations

How wire mesh sections improve performance and increase throughput capacity of process vessels handling both liquid and vapor-phase materials is described in bulletin.

Bul 16 is issued by Technical Librarian, Otto H. York Co., Inc., Dept. CP, 6 Central Avenue, West Orange, New Jersey. Specify CP 4258, pages 2 & 3.

Squeeze refrigeration costs with closer temperature approaches

Obtain 5°F. or closer with Trane Brazed Aluminum Heat Exchangers

Now, even when *large* heat transfer duties are involved, you can obtain temperature approaches of 5 degrees F. or closer! That means *less* refrigeration is required to bring a specified liquid or gas to desired temperature. Operating costs go *down!* You squeeze *more* out of every heat exchange dollar.

What's more, TRANE Brazed Aluminum heat transfer surface makes it *practical!*

TRANE Brazed Aluminum Heat Exchangers can pack up to 450 square feet of heat transfer surface into a single cubic foot. In fact, TRANE Brazed Aluminum Exchangers can occupy as little as *one-third* the space, can weigh as little as *one-fourth* as much as conventional exchangers . . . *and can cost less!*

Yet for all their lightness, compactness and low cost, TRANE Brazed Aluminum units withstand test pressures up to 1,000 psi. Installation costs are lower, too . . . maintenance greatly simplified.

Lower costs plus the ability to perform efficiently and economically at temperatures as low as −350 degrees F. explain why TRANE Brazed Aluminum Exchangers of the type shown at right are used by so many firms for oxygen and ammonia processing and similar uses.

If you have a heat transfer problem involving *close temperature* approaches, *multi-stream exchange* or *low temperatures*, it's time to call TRANE.

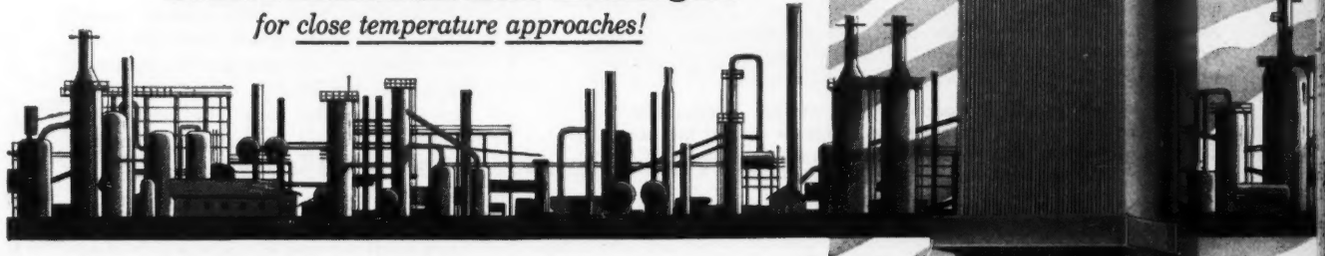
Our 30 years' experience in heat transfer is at your disposal. Just contact your nearest TRANE Sales Office or write on company letterhead to TRANE, La Crosse, Wis.

Specify

TRANE

Brazed Aluminum Heat Exchangers

for close temperature approaches!



MANUFACTURING ENGINEERS OF AIR CONDITIONING, HEATING, VENTILATING AND HEAT TRANSFER EQUIPMENT

The Trane Company, La Crosse, Wis. • Eastern Mfg. Div., Scranton, Pa.
Trane Co. of Canada, Ltd., Toronto • 90 U.S. and 15 Canadian Offices.

Coleman Flame Photometer

Sodium, Potassium AND CALCIUM directly, easily and accurately

New and Exclusive Atomizer-Burner . . . Burns common illuminating gas with oxygen for a stable high-temperature flame. No explosive tank gas required. Safe in the most inexperienced hands.

Simple Direct-Coupled Optics . . . No slits to adjust . . . no mirrors or prisms to align. Optical filters provide spectral isolation.

Direct Reading . . . Without internal standards. High temperature flame gives full excitation . . . eliminates need for chemical additives such as lithium.

Easy to Use . . . Safe in any laboratory. The Coleman Flame Photometer is as safe and easy to use as a Bunsen burner. Flame will not blow out or flash-back, and pressure adjustments are not critical.

Lowest Cost . . . Highest Value . . . The Coleman Flame Photometer is ready to operate with any modern Coleman Photometer . . . Junior Spectrophotometer, Universal Spectrophotometer, Electric Colorimeter, Photo-Nephelometer, or Nepho-Colorimeter . . . **costs only $450.00.**

For users who prefer to conduct flame analysis independent of other procedures or who do not have available one of the above Coleman instruments, a separate indicating instrument . . . the Coleman Galv-O-Meter is offered at $150.00.

For full details write for Bulletin B231

Coleman Instruments

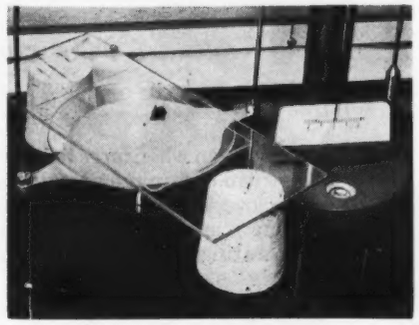
Dept. D, 318 Madison St., Maywood, Ill.

When inquiring check CP 4259 on handy form, pgs. 2-3

for the laboratory

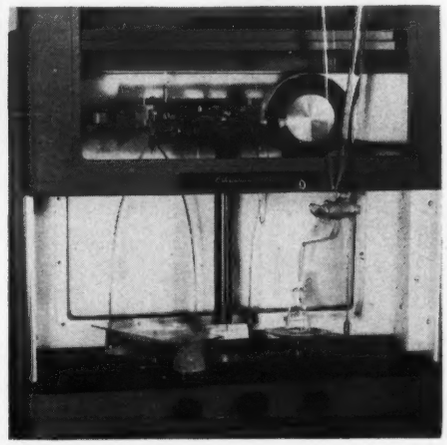
To insure against breakage in transit or in processing in consumers' plant, Columbian Carbon Co. developed test for . . .

determining crushing strength of carbon black beads



Amount of water that must be added to tared flask on pan of analytical balance to fracture bead determines crushing strength of carbon black bead

Arrangement of bead of carbon black for crushing between microscope slide glasses



One microscope slide glass is supported on the analytical balance pan and the second one suspended above and parallel to it

Simple yet accurate method uses equipment found in almost all laboratories

Carbon black beads must possess enough strength to insure against breakage during bulk handling in transit and in consumers' plants. W. C. Goodrich of Columbian Carbon Co., Brooklyn, N.Y., has developed a convenient method of measuring strength of beads using equipment found in almost any laboratory.

Method consists in crushing single carbon black beads between microscope slide glasses arranged so that pressure required can be determined accurately. Single bead is placed in center of glass slide supported on one pan of balance and counterpoised exactly by small glass flask on other pan. Second glass slide is arranged just above first one and parallel to it in such a way that any slight weight added to flask will bring the two glass slides in contact with the bead under test.

Water is measured into flask from analytical buret and breaking point of bead is accurately determined by measuring or weighing added water.

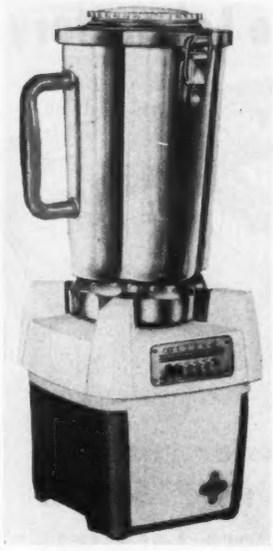
In practice, beads are screened and those held on 30 mesh are tested. Five from each lot are broken and breaking strength recorded as average of five values.

If anomalous values appear in course of day's operation, repeat tests are made of ten beads as checks.

(Balance used in test at Columbian Carbon is a Christian Becker Analytical Balance manufactured by Torsion Balance Co., Dept. CP, Clifton, N. J. . . . or for more information check CP 4260 on handy form, pages 2 and 3.)

High speed mixing with gal-size lab blendor

unit provides speeds to 16,000 rpm; handles variety of materials



Uses: Designed for high speed blending, pulping and mixing of products in laboratory quantities.

Features: Blendor has five speeds operated with push button controls. It handles large batches — up to one gallon at a time.

Description: Unit functions on alternating current of 115 volts which drives 1½ hp motor. Speeds range from 8000 to 16,000 rpm. Blendor has stainless steel container with handle for easy pouring. Blade assembly is easily removed for cleaning. Blendor is self-lubricating. Base of unit is die cast white enamel.

(Waring Blendor is distributed by Central Scientific Co., Dept. CP, 1700 Irving Park Rd., Chicago, Ill. . . . or for more information check CP 4261 on handy form, pages 2 and 3.)

Atom models permit building of molecules to scale

Illustrated 12-page catalog lists variety of laboratory apparatus including atom models for constructing macro-molecules. Model sets for studying atomic structure of organic molecules provide 30 structural unit types and advance the magnification of spheres of action of single atoms to 1.5×10^8. Some of the other apparatus listed includes: subsieve range, particle size analysis, test sieve vibrator, balance with 311-gram capacity, infrared water bath, and lattice rod support clamps.

Vol 6, No. 2 of "Lanco Apparatus News" is issued by Arthur S. La Pine & Co., Dept. CP, 6001 S. Knox Ave., Chicago 29, Ill. When inquiring specify CP 4262 on handy form, pages 2 and 3.

Is your plant contributing to this?

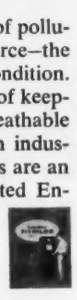
The Titrilog can lead to a cure!

Just a few parts per million doesn't sound like a serious concentration, but as few as 1 or 2 parts of a pollutant in a million parts of the atmosphere we breathe is creating one of today's most serious industrial safety and community-relations problems.

Consolidated's TITRILOG, an extremely sensitive instrument for monitoring, measuring and reporting on the sulfur compounds causing atmospheric pollution, provides a two-headed weapon against this growing problem. First, the TITRILOG continually measures the sulfur compounds in the air . . . at all times and under varying atmospheric conditions. Second, it provides a fast-acting, precise method for tracking down the *source* of the pollutants. The portable model is readily moved from point to point—even may be operated from a car or helicopter to sample a wide area during a single working day.

The TITRILOG's continuous record of the concentration of SO_2—one of the principal offending agents and a good index of pollution level—can serve two purposes. It can warn of unsafe or undesirable levels of pollution; it provides the clue to the source—the first step toward curing the over-all condition.

If you are faced with the problem of keeping your community's atmosphere breathable . . . or the problem of controlling an industrial process where sulfur compounds are an important factor, contact Consolidated Engineering. One of our Field Engineers will be pleased to show what the Titrilog can do for you. Write for Bulletin CEC 1810C-X3.



Consolidated Engineering
CORPORATION

ANALYTICAL INSTRUMENTS FOR SCIENCE AND INDUSTRY

300 North Sierra Madre Villa
Pasadena 15, California

Sales and Service through **CEC INSTRUMENTS, INC.,** *a subsidiary with offices in: Albuquerque, Atlanta, Buffalo, Chicago, Dallas, Detroit, New York, Pasadena, Philadelphia, Seattle, Washington, D.C.*

When inquiring check CP 4263 on handy form, pgs. 2-3

- **High speed mixing** — the right motor HP, the right impeller size, and just the right shaft RPM add up to high production and low operating cost.
- **One responsible source** — complete unit designed and backed by Nettco.
- **Full load tests** — completed in Nettco plant.
- **No shaft whip** — shaft run-out well within mechanical seal tolerance.

High Production Mixer
PASSES EVERY TEST

This agitator — the product of Nettco equipment and Nettco engineering — answers eight full pages of engineering specifications drawn up by one of the nation's largest chemical manufacturers. There was a lot of satisfaction in hearing our customer report: "OK on all counts".

Nettco can help you at every stage in the development of agitation systems: preliminary design, preparation of specifications, manufacture of agitating equipment to meet rigid specifications, and pre-testing of the finished units.

Next time see Nettco . . . for money-saving, time-saving agitation. New England Tank & Tower Co., 93 Tileston Street, Everett 49, Mass.

NETTCO
ENGINEERED AGITATION

When inquiring check CP 4264 on handy form, pgs. 2-3

LABORATORY

Roll gage on wet film to rapidly measure thickness . . .

may be used on flat, curved surfaces

Uses: Designed for accurate, fast checking of wet film thicknesses on plane or curved surfaces.

Features: Instrument and case fit in pocket. Direct-reading gage is available in seven ranges, from 0-0.4 mil to 20-60 mil, for measuring extremely thin, general range and heavy coatings.

Description: Gage consists of eccentric wheel supported by two concentric wheels. When rolled over wet film coatings, eccentric wheel contacts wet film leaving its highest level mark. Point of highest contact may be read in mils. Two rolls are made, each in opposite direction.

(Wet Film Thickness Gage is available from Gardner Laboratory, Inc., Dept. CP, 4723 Elm St., Bethesda 14, Md. . . . or check CP 4265, pages 2 and 3.)

Provides hot, cold water under line pressure for lab baths . . .

unit uses immersion heater and thermoregulator

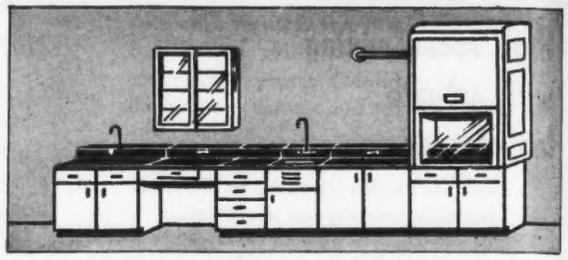
Uses: Intended for use with water baths or devices which require ready source of hot and cold water for temperature adjustment.

Features: Rapid recovery rate of heater is made possible by sensitive thermoregulator and high output of immersion heater.

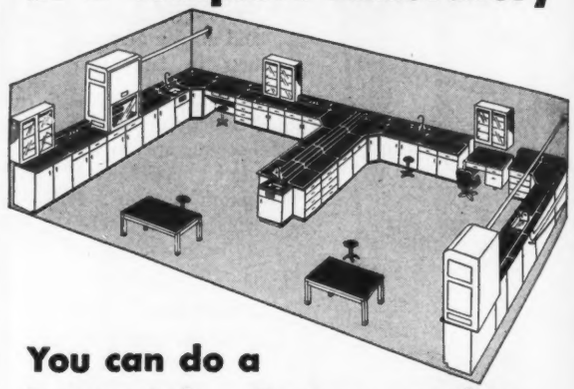
Description: Seamless spun brass dome tank holds 2.5 liters. All fittings enter through bottom with only the inlet, outlets, and control valves exposed. Thermoregulator is factory-adjusted for 140°F but settings to 200°F can be made.

(Automatic electric water heaters are a product of Parr Instrument Co., Dept. CP, 211 53rd St., Moline, Ill. . . . or check CP 4266, pages 2 and 3.)

A One-Wall Assembly . . .



or a Complete Laboratory

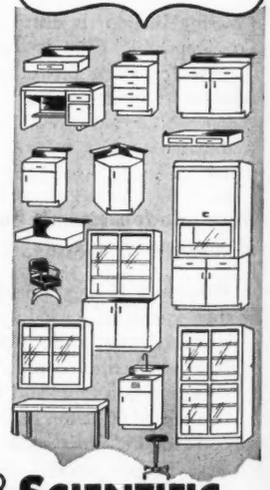


You can do a Better Job...Faster...and at Less Cost...with FISHER *Unitized* Laboratory Furniture

You just order the Fisher units you want . . . and supervise their simple installation . . . to completely equip any size, shape, or type of laboratory with functional, durable steel furniture. The completed installation not only has the advantages, without time-wasting disadvantages, of custom-built work; it also provides continued flexibility. You can dismantle Fisher *Unitized* Furniture in a day's time, and reassemble the units —together with additional units if desired—to meet the ever-changing needs of your progressive laboratory.

Send today for planning catalog.

SELECT FROM 21 BASIC STOCK UNITS



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America's Largest Manufacturer-Distributor of Laboratory Appliances and Reagent Chemicals

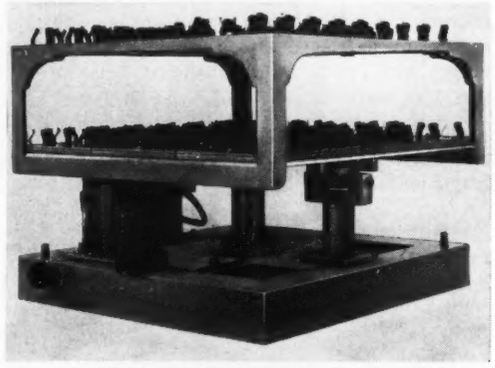
When inquiring check CP 4267 on handy form, pgs. 2-3

Positive rotary action assured with uneven loading of lab shaker . . .

double tier shaker has variable speed range from 125 to 350 oscillations per minute

Designed for general laboratory use, double tier gyrotory shaker accommodates 128 Erlenmeyer flasks (500 ml size). Shaker has built-in stabilizers to provide positive rotary action despite conditions of uneven loading. Eccentric motion is counterbalanced for smooth operation. Drive from motor to flywheel is underneath frame of shaker.

Unit has variable speed range of approximately 125 to 350 oscillations per minute with eccentric rotary motion of 1½". Power is supplied to shaker by ½ hp, 1725 rpm electric motor which operates



Eccentric motion of laboratory shaker is counterbalanced for smooth operation

on 60 cy, 110-220v single phase or 220v, three phase AC. Equipment requires 36 by 36" on lab bench and is 29" high when empty. One tier model which holds 64 Erlenmeyer flasks (500 ml size) is also available.

(Model S-4 and S1-4 are available from New Brunswick Scientific Co., Dept. CP, 10 Hiram St., New Brunswick, N. J. . . . or for more information about product reader may simply check CP 4268 on convenient Reader Service slip, located between pages 2 and 3.)

For the latest in laboratory equipment . . .

look in the alphabetized, itemized Product Directory beginning on page 199. All articles presented in this issue of CHEMICAL PROCESSING are listed there.

ratio-recording Spectrophotometer
ultraviolet — near-infrared

The Beckman Ratio-Recording Spectrophotometer brings the chemist a unique combination of the true double beam principle with single photo-receiver and amplifier. Utilizing a high-frequency beam chopper and switching system, it exploits such advantages of ratio recording as freedom from drift and line variation—and at the same time avoids problems of phototube matching and aging.

Combining the proven principles of the Beckman Model DK with a completely new Beckman-designed recorder, a new degree of flexibility has been achieved. Multi-Speed recording and scale expansion allow the operator to make every analysis at optimum efficiency. The automatic drive can be disengaged at any instant should the analyst wish to explore certain regions manually.

For maximum detection sensitivity over the entire 220 to 2850 mμ range the instrument uses a photomultiplier detector at the lower wavelengths and a lead-sulfide cell in the near-infrared.

Resolution — 0.3 mμ at 220 mμ; 2.5 mμ at 1000 mμ; 5 mμ at 2500 mμ — higher than any other instrument in its price range.

Scanning Speeds — 3, 6, 12, 24 minutes *and* 10 times each interval.

Fastest scanning speed covers the visible region in 20 sec., near-infrared in 40 sec. Very low speeds provide extreme resolution.

Recording Features — Scale expansion — selectable factors of 1, 2, 4, or 8.

Preprinted 11 x 17 easy-to-file charts—also available in Ozalid reproducible paper.

See your Beckman dealer or write for Data File 99-11

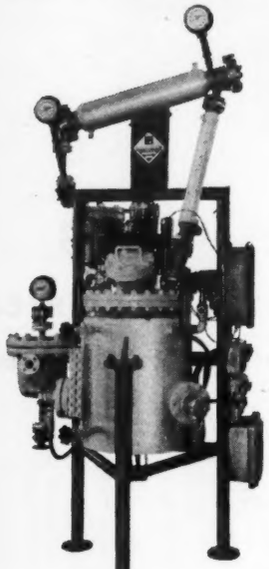
Beckman *division*
BECKMAN INSTRUMENTS, INC.
FULLERTON 1, CALIFORNIA

When inquiring check CP 4269 on handy form, pgs. 2-3

need a packaged Pilot Plant?

Now you can choose from a line of *standard* models... with internal contact surfaces of stainless steel... in capacities of five, ten or fifteen gallons... heated by steam, gas, or electricity. Each is equipped to handle a wide range of temperatures, pressures, rates of flow, and other physical variables.

Beyond this "standard" flexibility, each model can be readily adapted to fit even more specialized needs. By checking this line first, you can save original design cost and cut engineering and delivery time.... Here are two pilot plants and an autoclave already tested "on the job"...



15 GALLON PILOT PLANT

Design pressure for all vessels, jackets and piping 150 PSIG and full vacuum. Internal contact surfaces stainless steel, ground smooth.

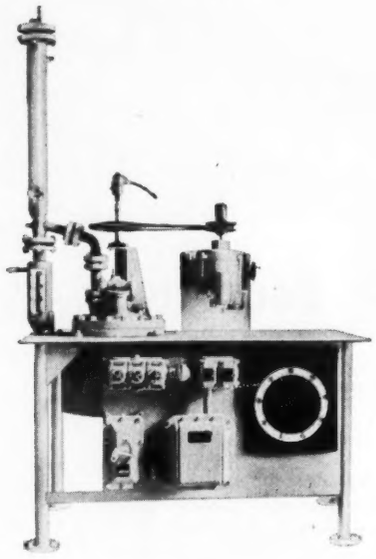
KETTLE: Jacketed sides and bottom for cooling and Dowtherm heating. Reactor designed for 700°F. Variable speed agitator.

CONDENSER: Removable core type. Water cooled shell.

DECANTER: Removable top head.

RECEIVER: 5 gallons capacity. Removable top head.

INSTRUMENTATION: Temperature recording controller and pressure indicator on reactor. Indicators for pressure, liquid level, temperature on reactor jacket. Other indicators on condenser, decanter, receiver. Flow indicator in condenser discharge piping.



5 GALLON DISTILLATION PILOT PLANT

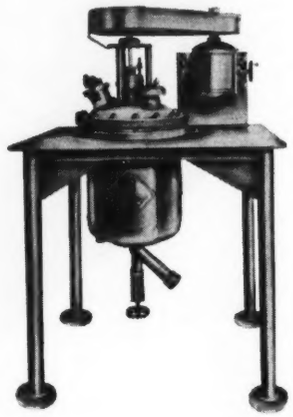
Designed as a complete packaged unit for alkyd resin experimentation. Active surfaces of stainless steel, ground smooth.

REACTOR: 150 PSIG design pressure. Internal cooling cylinder. Thermostatic controls. Variable speed agitator with hollow shaft for injection of gases into material.

CONDENSER: Arranged to operate in any position.

DECANTER: Stainless steel. Sight glass.

INSULATION JACKET: Arranged to protect main body of vessel as well as to service electric heaters.



10 GALLON LAB AUTOCLAVE

Vertical design with removable top cover, stainless steel internal surfaces.

AUTOCLAVE: Designed for full vacuum pressure.

JACKET: Designed for 100 lb. pressure.

AGITATOR: Speed of 34–138 rpm. p-k Agitator 15" diameter.

Want a quotation? **complete specifications . . . ? We'll be happy to send you more information on these and other units in p-k's wide line of research, development and production equipment for the processing industries. Send us your question, specific or general.**

The Patterson-Kelley Co., Inc.

820 Lackawanna Avenue, East Stroudsburg, Penna.

a558

101 Park Avenue, New York 17 • Railway Exchange Building, Chicago 4 • 1700 Walnut Street, Philadelphia 3 • 96-A Huntington Avenue, Boston 16 • and other principal cities.

When inquiring check CP 4270 on handy form, pgs. 2-3

FOR THE LABORATORY

Complete visual or UV curves continuously recorded in 1½ minutes . . .

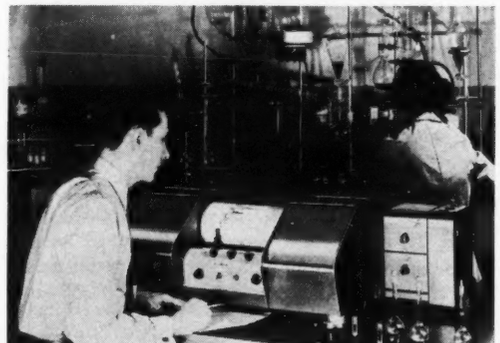
recorder designed for use with Model DU spectrophotometer as monochromator

Uses: For recording visible and ultraviolet absorption spectra or emission spectrum of any source—flame, gas-discharge, or fluorescence.

Features: Pen speed control is continuously variable between 1½ and 12 minutes with 45 second reset. Speed can be varied during operation without stopping or affecting continuity of data. Interchangeable plug-in components are used in electronic system which enables on-the-spot repairs and replacements to be made.

Description: Recorder operates normally in two ranges: visible spectrum from 350 to 750 millimicrons; in ultraviolet range from 215 to 375 millimicrons. It is easily adjusted to cover other ranges, with or without expansion, between 200 and 750 millimicrons.

Transmittance scale is visible at all times on control panel. Pointer shows position of pen. Wavelength setting and slit adjustment of monochroma-



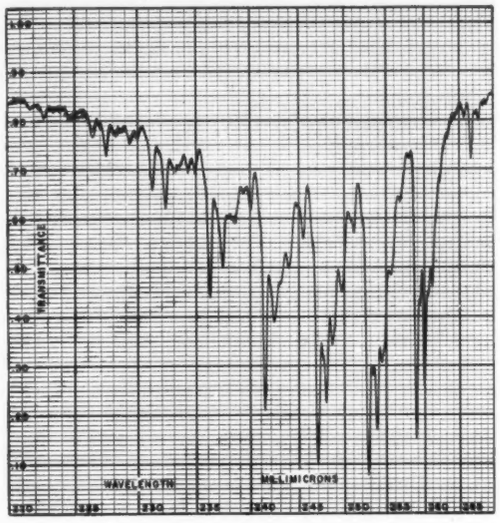
Switch on front panel changes instrument from double-beam to single-beam

tor appear through windows. Preprinted graph paper (11 x 17") which shows wavelength accurately is available for either visible or ultraviolet range. Paper used has good dimensional stability (less than 0.25% change between 20% and 90% humidity.)

Spectracord recorder converts standard Beckman Model DU spectrophotometer into double-beam instrument which automatically compensates for fluctuations in light source or power supply. DU cell compartment is replaced by unit which includes beam-splitter, sample and reference cells, and matched photomultiplier tubes. Flip of switch on front panel converts unit into single-beam instru-

ment for studying emission spectra, fluorescence, polarization phenomena, and other changes in source-intensity.

Fine adjustment of pen position is stable to 0.4% over 12-hour period. Switch expands transmittance scale ten times for greater accuracy of values below 10% at any time. Zero adjustment may be



Benzene vapor curve recorded on expanded UV scale has been traced at speeds ranging from 1½ to 12 minutes (eight traces superimposed). Slit width was 0.035 mm at 250 mμ

checked by opening sample door and without removing samples. Zero set is stable to 0.2% over 12 hours. Photometer has accuracy of 0.5% and precision of 0.2%. Unit draws 250w at 117v, 60 cy AC and is regulated for 10% line voltage fluctuations.

(Warren Spectracord recorder is available from Fisher Scientific Co., Dept. CP, 717 Forbes St., Pittsburgh 19, Pa. . . . or for more information reader may simply check CP 4271 on handy form, pages 2 and 3.)

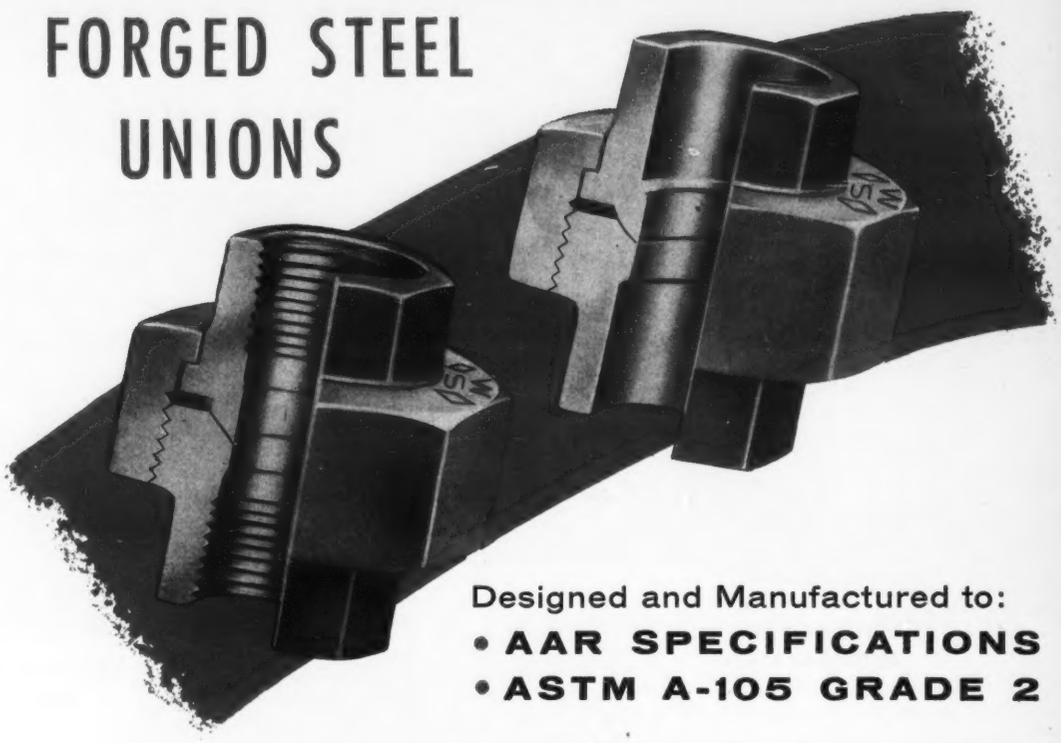
Outlines instructions, applications for temp-sensitive crayons

Leaflet gives instructions for using temperature-sensitive crayons on smooth or polished surfaces, rotating or moving objects, and brightly-radiating hot surfaces. Sample pellets of manufacturer's product are also included with data sheet.

Instruction Sheet 5010 ST is issued by Tempil Corporation, Dept. CP, 11 W. 25th St., New York 10, N.Y. When inquiring reader may simply specify CP 4272 on convenient Reader Service slip between pages 2 and 3.

WATSON-STILLMAN

FORGED STEEL UNIONS



Designed and Manufactured to:

- **AAR SPECIFICATIONS**
- **ASTM A-105 GRADE 2**

We're happy to announce the arrival of these fine additions to our Forged Steel Fittings Family. Designed by Watson-Stillman engineers and manufactured on our new high precision machinery, these unions give you the utmost in serviceability in high pressure piping systems.

These outstanding features are just what you've been looking for:

1. All parts are drop-forged of high quality steel for maximum strength and toughness to resist shock and vibration.
2. Heavy, octagonal-shaped walls give you added protection at high pressures.
3. Steel-to-steel seat with ball-to-angle mating surfaces insures a tight, leakproof seal.
4. Nuts are plated with a heavy coat of cadmium to resist galling and seizing.

Watson-Stillman Unions are available in both Screw-End and Socket-Welding Types in sizes ⅛" to 2". For complete technical information write today for our new Union Bulletin.

Sold Through Leading Distributors

Send today for Bulletin U-1

WATSON-STILLMAN FITTINGS DIVISION

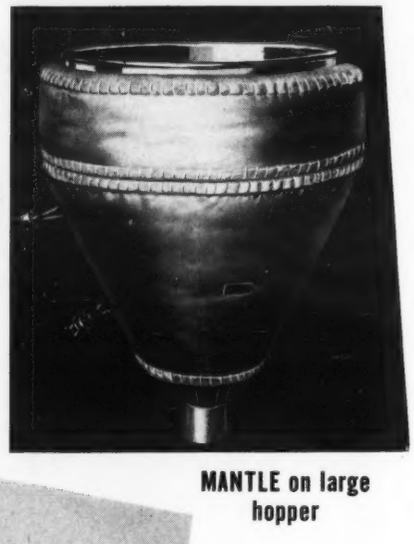
H. K. PORTER COMPANY, INC.
Roselle, New Jersey

8

When inquiring check CP 4273 on handy form, pgs. 2-3

MANTLE on a large distillation kettle

Do you have a pilot plant Heating Problem?

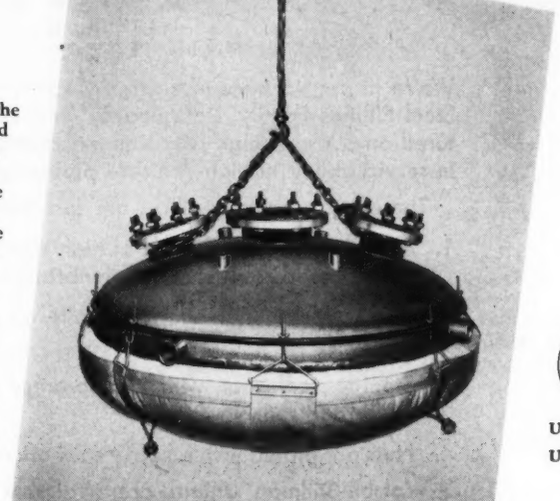


MANTLE on large hopper

Glas-Col Heating Mantles, for the large distillation kettle, hopper, and vacuum evaporator shown, are just a few of the broad line of mantles that Glas-Col has available for the safe, controlled heating of inflammable liquids in pilot plants. These mantles provide smooth, even heat through step-wise control of heat input . . . superheating of vapors is prevented . . . no hot spots to char valuable chemicals.

Glas-Col mantles are ideal where safe, controlled heating is needed. There are no flames or dangerously exposed wires, since the heating elements of Glas-Col mantles are imbedded in glass or quartz. This reduces fire hazard. For your pilot plant heating problems, consult Glas-Col engineers.

Glas-Col Apparatus Co., Inc.
Dept. CP, 711 Hulman Street
Terre Haute, Indiana



MANTLE on large vacuum evaporator

U. S. Patent No. 2,282,078
U. S. Patent No. 2,231,506

GLAS-COL

Trademark Registered U. S. Patent Office

Specialists in Laboratory and Pilot Plant Heating Problems

Electric Heating Mantles

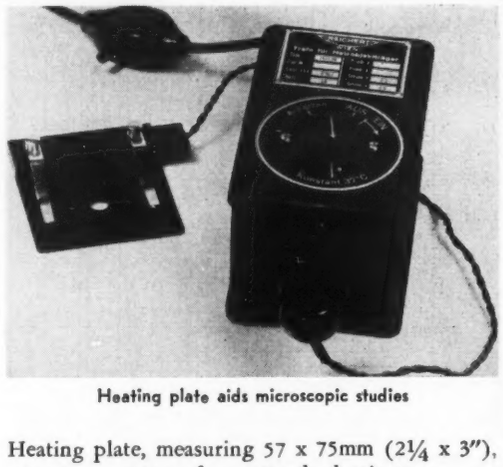
When inquiring check CP 4274 on handy form, pgs. 2-3

FOR THE LABORATORY

Facilitates microscopic study of sperms, cultures

Incubator stage for microscopes consists of heating plate, electrical heating element, and variable transformer for controlling temps in the range of 35-40°C.

Unit permits efficient study at high magnifications, has been successful in investigation of tissue cultures, sperms, blood, and endoparasites. It is also suitable for work in contrast phase microscopy.



Heating plate aids microscopic studies

Heating plate, measuring 57 x 75mm (2¼ x 3″), mounts on stage of any standard microscope, accommodates standard specimen slides.

(Biotherm incubator stage is available in US through Wm. J. Hacker & Co., Inc., Dept. CP, 82 Beaver St., New York 5, N.Y. . . . or for more information check CP 4275 on handy form, pages 2 and 3.)

Delicate parts cleaned safely using easy-to-operate ultrasonic generator

Uses: For production cleaning of complex or delicate parts and laboratory instrument for ultrasonic experimentation.

Features: Used as cleaning apparatus, parts to a maximum dimension of 4″ may be cleaned by simply immersing them in ultrasonically energized cleaning solvent. Grease, rosin, coatings, solder, dirt, honing or machining particles are removed quickly from inaccessible crevices, filaments, etc.

Used as lab instrument, generator permits experiments on effects of ultrasonic exposure on small liquid samples. Applications that may be tried are initiation and control of chemical reacions, emulsification, dispersion, bacteria destruction or stimulation and particle or molecular breakdown.

Description: Barium titanate transducer, resonant

Ultrasonic generator is simple to operate and can be used for cleaning or testing purposes

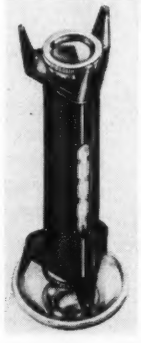
at frequency of one megacycle, driven by 50 watt RF frequency generator, radiates high energy, high frequency mechanical vibration into quart-size container of cleaning solvent. For lab experiments, liquid sample in test tube is substituted for cleaning solvent.

Construction features are stainless steel cleaning container with plug-in interchangeability. Power supply is 110v, 60 cycle.

(Model 50 Series Liquid Load Ultrasonic Generator is a product of the McKenna Laboratories, Dept. CP, 2503 Main St., Santa Monica, Calif. . . . or check CP 4276 on handy form, pages 2 and 3.)

Determine viscosity of liquids up to 40,000 centipoises with portable unit . . .

suitable for field work, viscosimeter is 5½" high and weighs less than 11 oz



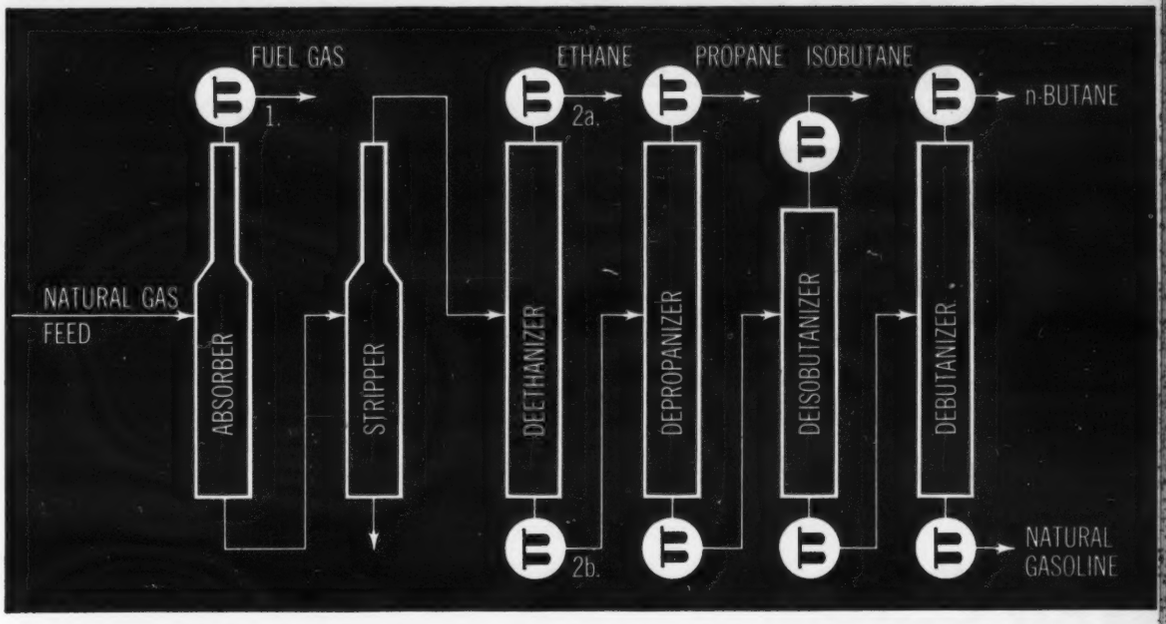
Uses: For rapid and simple determination of viscosity of liquids.

Features: Compact viscosimeter weighs less than 11 oz and stands 5½" high, measures viscosities up to 40,000 centipoises.

Description: Viscosimeter consists of precision bore glass tube fitted into metal housing with viewing windows at each end. Built-in thermometer indicates temperature of liquid at time of testing. When tube is filled with liquid, ball is dropped into tube and end cap replaced. Unit is turned upside down. Falling time of ball in seconds multiplied by ball constant gives answer in centipoises.

(Falling ball viscosimeter is a product of National Instrument Co., Dept. CP, 5005 Queensbury Ave., Baltimore 15, Md. Check CP 4277, pages 2 and 3.)

TRUE CONTROL BEGINS WITH ANALYSIS...



TRI-NONs Up Efficiency in Light Hydrocarbon Separations

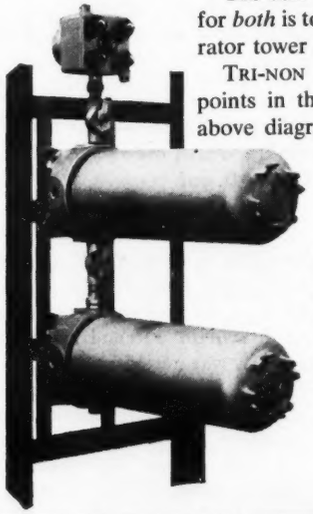
It is simple to produce high product purity in light hydrocarbon separations, but only at the expense of percent recovery, or to obtain 100 percent recovery at a sacrifice of purity. But operating *profit* depends upon the ability to obtain a maximum of both product purity and percent recovery. Close control of the process environment: temperature, pressure, flow rate, is not sufficient since environmental controls do not give any indication of stream composition.

The best way to insure maximum returns for *both* is to analyze continuously the separator tower overhead and bottoms.

TRI-NON Analyzers installed at critical points in the process, as indicated in the above diagram, monitor the concentration of the important components.

Analyzer 1 measures the concentration of hydrocarbons heavier than methane in the absorber overhead to check absorber efficiency. Analyzers 2a and 2b indicate ethane purity and ethane loss in the bottoms. The remaining analyzers perform the same functions on the other towers. The data provided permit operation at the most profitable level at all times.

In light hydrocarbon separation as well as in practically all other chemical processing—True Control Begins with Analysis. Perkin-Elmer's continuous infrared analyzers can provide the ANALYTICAL CONTROL essential for most profitable operation. Perkin-Elmer engineers can show you how analytical control can be applied to your process.



Both the TRI-NON *and* BICHROMATOR Analyzer *continuously record the concentration of any desired stream component. Each is sensitized and adjusted to specific plant conditions before shipping.*

THE PERKIN-ELMER CORPORATION
870 Main Avenue, Norwalk, Conn.

Gentlemen:

☐ Send information on the application of infrared analytical control to the following process problem: .....

.....

☐ Send literature on your infrared plant stream analyzers

☐ Have a sales engineer call

Name ..... Title .....

Company .....

Address .....

PERKIN ELMER — *FIRST IN ANALYTICAL CONTROL*

When inquiring check CP 4278 on handy form, pgs. 2-3

Bemis B-FLEX*

A Better Multiwall Valve Bag FOR LESS!

Look at these B-FLEX benefits:

LOWER BAG COSTS... Save up to $2.50 per thousand.

FASTER PACKING... LOWER PRODUCTION COSTS.

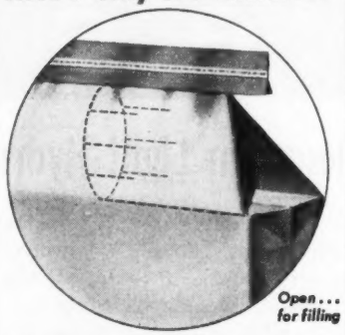
UNIFORM WEIGHTS ... stop over-packing.

MINIMUM SIFTING.

Ask your Bemis Man for the *complete* B-FLEX story.

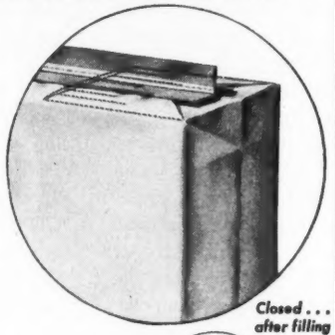
With Bemis B-FLEX Bags, you also get the same bonus you get with all Bemis Multiwalls—**BEMIS MULTI-COLOR PRINTING** ... your brand at its finest on multiwall bags.

Here's Why It's Better...

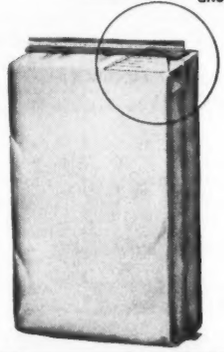


Open... for filling

The FLEX Does the Trick...



Closed... after filling



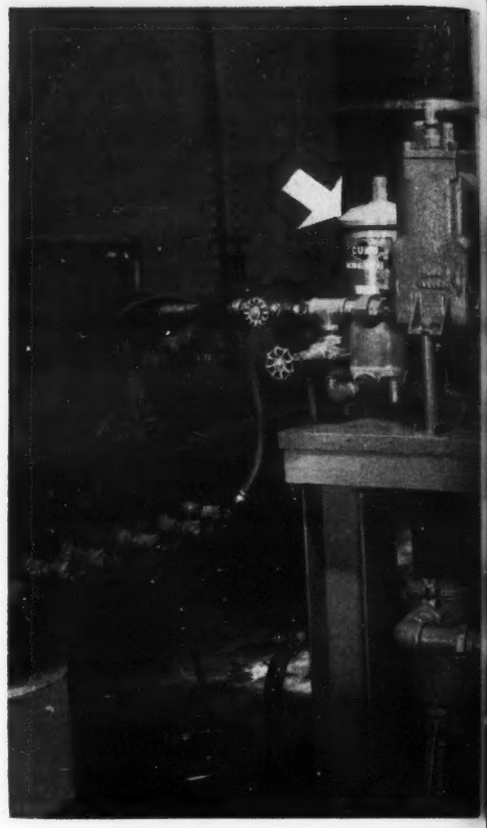
Bemis

BEMIS BRO BAG COMPANY

General Offices—St. Louis 2, Mo.
Sales Offices in Principal Cities

*Trade-mark

When inquiring check CP 4279 on handy form, pgs. 2-3



WILLIAM B. WINKLER,
Factory Manager
T. F. Washburn Co., Chicago, Illinois
With **GORDON WEYERMULLER,**
Associate Editor

Unit uses replaceable cartridges —

filters wax economically and efficiently

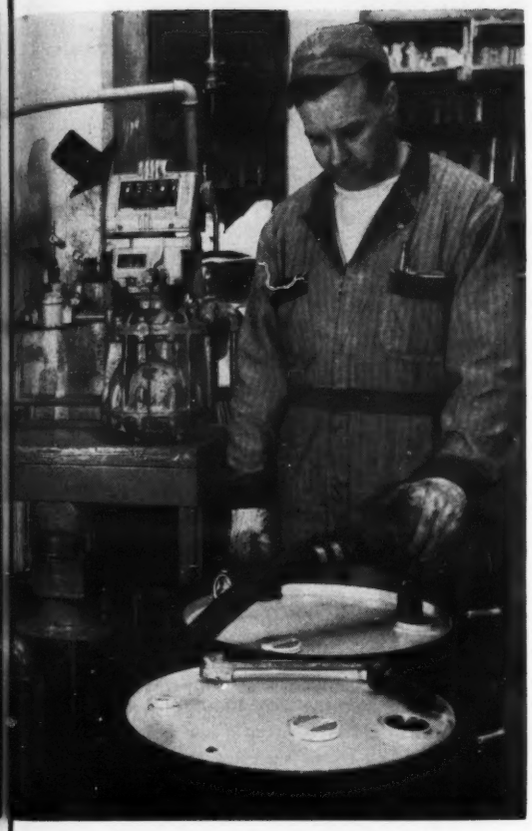
Filling line also utilizes metering device which measures flow to 1/10 gal

Problem: Screen initially used in floor wax filling line at T. F. Washburn Co., Chicago, Ill., did not remove fine particles of dirt. Also, method of measuring out product was not entirely satisfactory. Each drum had to be moved onto a scale for filling. When pails were used, volume was estimated by eye. Procedure did not provide any means for accurately keeping track of amount of wax filled in a day.

Solution: Approximately two years ago company installed Micro-Klean filter and Xacto meter shown in photograph. Wax passes through bucket screen first, is then pumped through the filter, next goes through air-release device, and then to meter.

Filter utilizes replaceable cartridges with openings that become progressively smaller in size. With this design, unit does not plug easily. Filter is economically priced. Cartridges, which cost about 75c apiece, are replaced about every two weeks. Another filter of this type is used on same application and two additional units on other applications.

Meter, which operates by positive displacement, retains accuracy within wide range of flow and pressure. Interior working parts



Filter (arrow at left) removes fine particles from wax, which is metered (arrow at right) as it goes to drums

are made of carbon and stainless steel to resist corrosion. A second meter is being used by company on same application.

Results: Filter removes fine particles and maintains high purity of product. Unit is considered to be an economical solution to the filtration problem since plant feels that it might be expensive to go to another type of equipment. No maintenance has been necessary on filter.

Meter measures liquid going to each container with an accuracy to 1/10th of a gallon. When desired, it permits pails to be only partly filled so customer can add required water and save freight. Pre-determining dial can be set for different quantities according to size of container. Unit keeps an accurate record of amount of wax filled in one day.

(Micro-Klean filter is product of The Cuno Engineering Corp., Dept. CP, Meriden, Conn. . . . or for more information check CP 4280 on handy form, pages 2 and 3.)

(Xacto meter is manufactured by Bowser, Inc., Dept. CP, 1365 Creighton Ave., Dept. CP, Fort Wayne, Ind. . . . or for more information check CP 4280A on handy form, pages 2 and 3.)

ship kid-glove chemicals

in Hackney Drums

of stainless steel
Monel Metal
or Nickel

...Tight Head or Removable Head Types

Here's the returnable shipping container to protect your sensitive chemicals, oils, and food products against contamination during shipment or in storage. Tight head or removable head Hackney Drums are available in several types of stainless steel—or in Monel metal—or in nickel. Choose the metal that treats your product best—and be sure the high purity of your product is protected all the way to its destination.

Both open head and tight head models are ruggedly built for long life and low damage claims. Both have smooth, crack-free interiors that are easily kept spotlessly clean. Can be furnished as mixing containers without I-bars, cover or clamp ring if desired.

Write for specifications and details. Ask for the new Hackney Drum and Barrel Catalog which describes Hackney engineered containers for all solids and liquids.

PRESSED STEEL TANK COMPANY

Manufacturer of Hackney Products

1463 S. 66th St., Milwaukee 14 • 52 Vanderbilt Ave., Room 2087, New York 17
235 Hanna Bldg., Cleveland 15 • 936 W. Peachtree St., N. W., Room 126, Atlanta 3
208 S. LaSalle St., Room 796, Chicago 4 • 568 Roosevelt Bldg., Los Angeles 17
18 W. 43rd St., Room 19, Kansas City 11, Mo. • 144 Wallace Ave., Downingtown, Pa.

Hackney MILWAUKEE

CONTAINERS FOR GASES, LIQUIDS AND SOLIDS

When inquiring check CP 4281 on handy form, pgs. 2-3

How much

tailor-made service

can we pack into a steel container?

We're fully aware that *your* packaging problems are not exactly the same as those of other steel container users. That is why we go out of our way to hand-tailor our deliveries, our lithography, engineering and other services to your specific requirements. We make available all the help you can use, anytime you say. Before you place another order for steel containers, why not listen to our story? We'd relish a chance to work with you—not just as suppliers, but as interested counselors and friends.

Standard styles include pails, drums, handi cans. Always glad to discuss special-purpose containers.

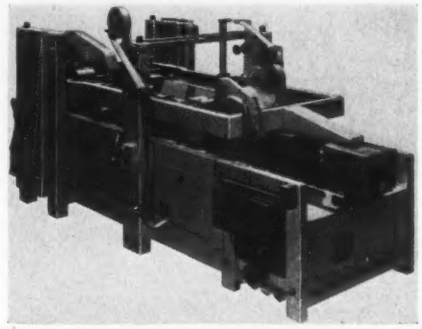
CONTINENTAL CAN COMPANY

Eastern Division: 100 E. 42nd St., New York 17
Central Division: 135 So. La Salle St., Chicago 3
Pacific Division: Russ Building, San Francisco 4

When inquiring check CP 4282 on handy form, pgs. 2-3

Glues and tapes cases in single pass machine

Automatic gluing and taping simultaneously of tops and bottoms of shipping cartons provides strong, dust-tight double-sealing in a single operation. The only function of the operator is to keep the machine



Automatic gluer and taper for shipping cases

supplied with glue and tape. The standard machine easily adjusts in three minutes for carton sizes ranging as follows: Length 10″ to 22.4″. Width 5.1″ to 13.8″. Height 4.9″ to 17.7″.

Glue rollers are adjustable to glue all or part of the flap. Each tape unit holds two 1500 foot rolls of tape. An automatic alarm warns of a low tape supply. A two horse power motor operates the equipment which moves cartons with chain driven feeder bars.

(Case Gluing and Taping Machine Model F 24 is manufactured by Clybourne Machine Corp., Dept. CP, 6479 N. Avondale Ave. Chicago 31, Ill. For additional information check CP 4283 on handy form, pages 2 and 3.)

Economies of space and operation realized by fully automatic vial filler and sealer . . .

variations in unit permit filling rates to 120 per minute

Uses: Automatic filling, stoppering, and capping of vials and ampules with pharmaceutical products in liquid or powder form.

Features: Unit is designed for economy in operation and space occupancy. Its compact features include provisions for easy maintenance of sterile requirements throughout the three coordinated operations.

Description: Adjustments on fully automatic unit are easily made for different sizes of vials. Made in Western Germany by Hoefliger & Karg, the machine is available in these variations: single head, rated at 30 to 50 containers/min; double

Double-head filling unit is rated at 60 to 80 containers per minute

head, rated at 60 to 80/min; and triple head, rated at 100 to 120/min.

The three units integrated in this equipment are also available as individual machines.

(Vial filling machine is distributed in this country by Alfred Hofmann & Co., Dept. CP, 629-635 59th St., West New York, N.J. . . . or for more information check CP 4284, pages 2 and 3.)

As you read CP —

When You Want More Information

. . . on some product or service discussed, look for the name of manufacturer or supplier, with address . . . at end of editorial article

The information in our "source" paragraph is put there by the editors for your convenience and use when you want further details on ideas or developments discussed in the story. (Did you wonder, "Is this some sort of advertising?") A letter to the given manufacturer . . . or a check on the handy Reader Service slip . . . will bring you the added information you want. This idea was pioneered in the chemical field by Putman Publishing Company many years ago . . to help busy men like you!

THE EDITORS

the multiwall bags backed by 107 years of know-how...

CHASE Multiwalls

Call on your "C"-Man, your Chase representative. You can't put your problems in more capable hands. You can't put your products in better bags.

Sewn valve, sewn open mouth, pasted valve, pasted open mouth

For samples and current prices, write Department 20-L

SINCE 1847

CHASE BAG COMPANY

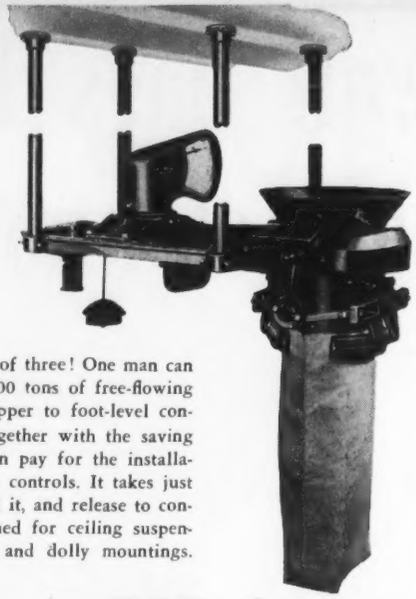
General Sales Office: 309 West Jackson Blvd., Chicago 6, Illinois

30 BRANCHES AND SALES OFFICES—STRATEGICALLY LOCATED

When inquiring check CP 4285 on handy form, pgs. 2-3

EXACT WEIGHT Sacking Scales

. . . sack, weigh, and check . . . in ONE operation



One simple operation does the work of three! One man can bag, weigh, and check as much as 100 tons of free-flowing materials per day from overhead hopper to foot-level conveyor. The saving in labor costs, together with the saving from elimination of over-weights, can pay for the installation. Simple to operate, has just two controls. It takes just four easy motions to attach a bag, fill it, and release to conveyor. Model 2229, shown, is designed for ceiling suspension. Others feature post, pedestal, and dolly mountings. Write for details.

Exact Weight Scales

Better quality control

Better cost control

THE EXACT WEIGHT SCALE COMPANY

905 W. Fifth Avenue, Columbus 8, Ohio

In Canada: P.O. Box 179, Station S, Toronto 18, Ont.

When inquiring check CP 4286 on handy form, pgs. 2-3

CATAWISSA VALVE & FITTINGS CO.

CATAWISSA • PENNSYLVANIA

Costs cut at once as portable tool closes cans . . .

friction-top containers capped 12 times faster

Uses: Cleaning standard quart or gallon size double-tight, friction-top containers. Portable tool is designed especially for small batch runs, laboratories, and smaller manufacturers who do not have expensive closing machinery.

Features: Tests show that closing tool is twelve times faster than hand closing method, thus reducing production costs.

Description: Closing tool is of aluminum construction and weighs 3½ lb for the gallon size and 2¼ lb for the quart size.

Two steel handles, topped with non-slip ball-shaped hand grips, afford the leverage necessary for perfect tight sealing without effort on part of operator.

(Can closing tool is a product of F. H. Wiessner Co., Dept. CP, Burlington, Vt. . . . or check CP 4288, pages 2 and 3.)

Capacity restrictions on steel containers aid industry

New uniform capacity restrictions originally proposed for a number of ICC specifications to provide added capacities for petroleum and chemical industries, have been adopted by Interstate Commerce Commission, effective December 2.

When inquiring check CP 4289 on handy form, pgs. 2-3

FISCHBEIN Portable BAG CLOSER

- A *truly* portable bag closer . . . Weighs only 10½ pounds.
- Requires no installation . . . plug into any outlet.
- Handles textile and paper bags.
- Simple to operate and maintain.
- Lowest priced bag closer on the market.

FOR DETAILS, MAIL THIS COUPON NOW

DAVE FISCHBEIN CO.
Dept. 9B
38 Glenwood Ave. N.
Minneapolis, Minn.

Name.....

Firm Name.....

Address.....

City.....

State.....

When inquiring check CP 4290 on handy form, pgs. 2-3

Specifications affected are ICC-5B, 17C, 17E, 17H, and 17X, wherein minimum actual capacity of containers is defined as not less than rated (marked) capacity plus 4% and maximum actual capacity as not greater than rated (marked) capacity plus 5% or rated (marked) capacity plus 4% plus 1 quart whichever is greater.

(Information courtesy of Steel Shipping Container Institute, Inc., Dept. CP, 600 Fifth Ave., New York 20, N. Y.)

Filling machine handle locks in place during fill cycle . . .

redesign of small unit includes stainless spouts

Uses: Filling bottles and cans from fractional ounces to quarts with practically any still liquid.

Features: Redesigned unit includes drill press handle that locks into position during filling cycle. Another improvement on this unit is installation of motor, pump, and filter out of sight within body of machine.

Description: Filling machine, designated Model A Small Packager, is equipped with standard, interchangeable, stainless steel spout assemblies. It is available in a vacuum model, equipped with three to six spouts; and a gravity model, equipped with three spouts, both with clear plastic tubing. Machine will handle containers at speeds ranging up to 40 per minute.

(Filling machine is a product of Packer Machinery Corporation, Dept. CP, 30 Irving Place, New York 3, N. Y. . . . or for more information reader may simply check CP 4291 on the convenient Reader Service slip which is located between pages two and three.)

For more information on product at right, specify CP 4292 . . . see information request blank between pages 2 and 3.

How to make a lasting impression

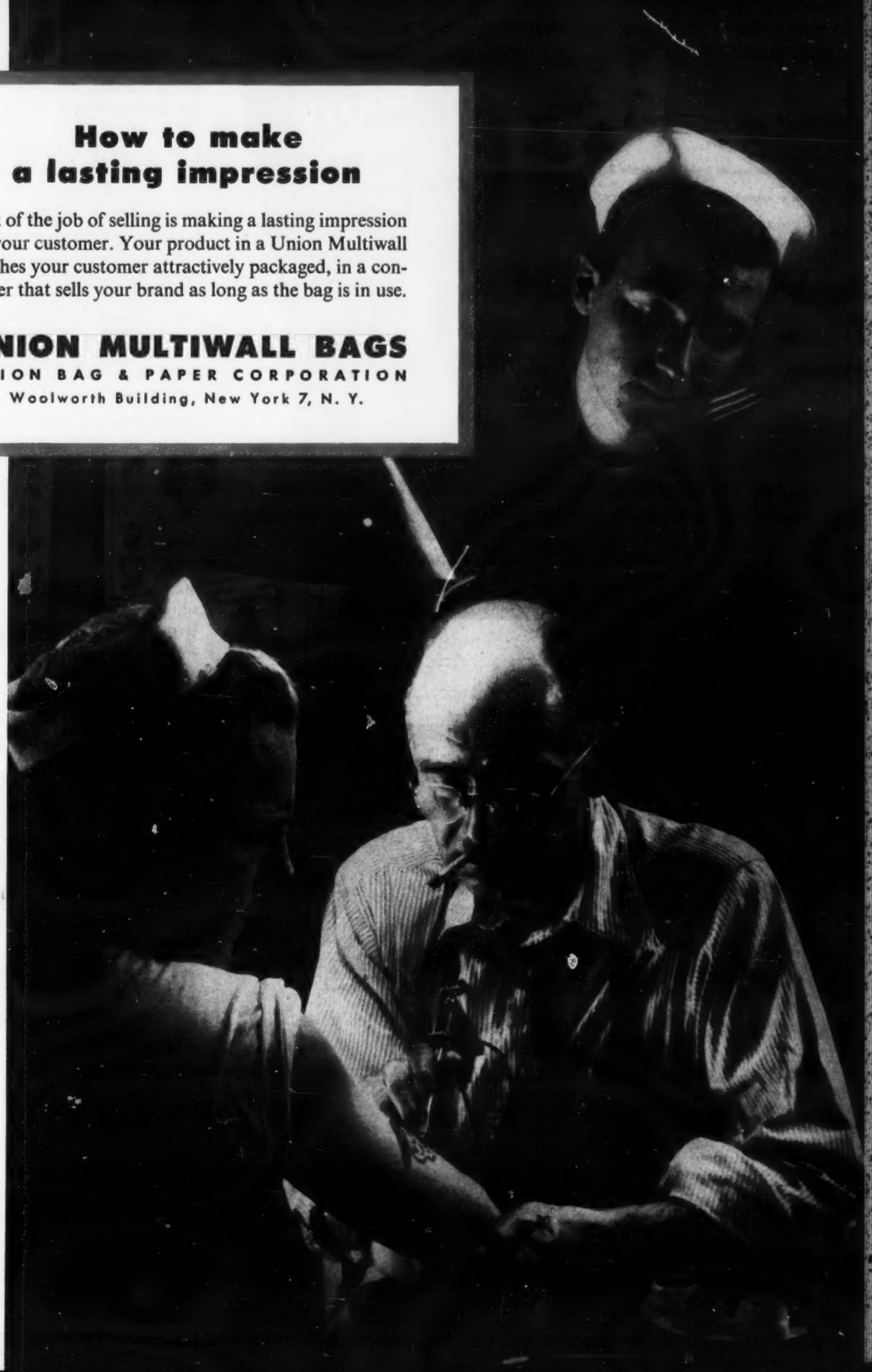
Part of the job of selling is making a lasting impression on your customer. Your product in a Union Multiwall reaches your customer attractively packaged, in a container that sells your brand as long as the bag is in use.

UNION MULTIWALL BAGS

UNION BAG & PAPER CORPORATION

Woolworth Building, New York 7, N. Y.

TRADE MARK UNION



Only THAYER can give you this net weighing performance

- 25 to 200 pound loads — on the same scale
- at rates up to 12 per minute
- handling granular, flake, pellet and fibrous materials
- with tolerances held to within 2 ounces
- in a completely automatic operation

You demand speed and precision in your other production and control devices. Enjoy them in your bagging and batchweighing *too* by using a Thayer 1000N Net Weight Filling Scale. Completely automatic, the 1000N scale net weighs and discharges loads in any desired weight from 25 to 200 pounds. Equally efficient with chemicals, plastics — any materials — whether in granular, flake, pellet or fibrous form. Loads may be discharged into blender or conveyor, valve bag packing machine or bags, drums or cartons. Load variations, dump frequency and dumps per cycle are precisely controlled by conveniently located electric and mechanical controls.
Like all Thayer Scales, the 1000N employs a shockproof leverage system that eliminates knife-edge pivots, dust-proof construction plus other exclusive Thayer features. Write for bulletin 1000N today.

Weighing of *powdered materials* got you stymied? . . . chances are the Thayer Model 600G holds the answer to your problem. Write for bulletin 600G.

THE Thayer SCALE

THAYER SCALE AND ENGINEERING CORP.
492 EAST WATER STREET, ROCKLAND, MASS.
Where weight is worth money . . . it pays to be sure!

When inquiring check CP 4293 on handy form, pgs. 2-3

You can't argue with experience, for over 100 years Harrisburg Steel has been producing high quality steel products . . . so it is only natural they manufacture the best cylinders.

Harrisburg's seamless steel cylinders for high pressure gases range in capacities from 14 to 400 cubic feet . . . in both Domestic and Export types . . . to I.C.C. specifications. Harrisburg also offers technical service to solve any problems you have regarding cylinders . . . just contact our Sales Engineer.

Write today for our Catalog and prices.

HSC-CC-3/54

101 YEARS IN PENNSYLVANIA'S CAPITAL
Harrisburg Steel
CORPORATION
HARRISBURG 24, PENNSYLVANIA

When inquiring check CP 4294 on handy form, pgs. 2-3

Accurately metered fill given liquids, creams by low-cost unit

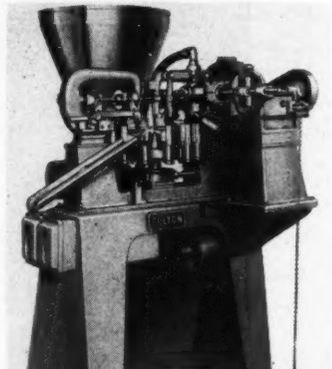
Uses: Filling, closing, and crimping tubes. Unit handles liquids, creams, and pastes.

Features: Tubes are filled by accurately metered volume and not by displacement. For filling pastes which tend to trap air, a long, bent nozzle is provided so that tubes can be filled from bottom up. This operation is semi-automatic. Operation is fully automatic when filling liquids and light creams.

Descriptions: Positive feed gear pump for filling creams and pastes is the same unit used on higher production machines. Pedal operation through a single revolution clutch gives operator positive no-tube-no-fill control as well as control of filling speeds.

Machine, designated No. 113, is adjustable to automatically provide either double or triple fold closure. Capacities range from 20 to 30 tubes a minute for pastes, to 40 tubes for liquids. Tube sizes are up to 1¼ by 7" with a maximum fill of 6 fluid ounces. Capacity of hopper is 15 gal.

(Tube filling machine is a product of Arthur Colton Co., Dept. CP, 3400 E. Lafayette St., Detroit 7, Mich. . . check CP 4295, pgs. 2-3.)



Has same positive feed gear pump as higher production filling machines

Left— Union Special Style 20100 H Bag Closing Machine

Here's how to close MULTIWALL PAPER BAGS

FOR lower production costs ...stronger, neater closures ...ability to get out rush orders in a hurry, you can't beat Union Special Bag Closing Machines! Specially built to stand up under heavy production schedules, these machines provide the high output rates needed to meet modern competitive conditions.

In the Union Special line, it's easy to find the right unit to meet your particular requirements. ASK FOR RECOMMENDATIONS.

SEND FOR THIS BULLETIN!

Get your copy of this 16 page illustrated bulletin containing helpful data and charts on the complete Union Special line of bag closing machines. UNION SPECIAL MACHINE CO., 442 North Franklin Street, Chicago 10, Illinois

UNION SPECIAL

When inquiring check CP 4296 on handy form, pgs. 2-3

production all gummed up...?

...see what a difference
AVERY Kum Kleen LABELS will make
...they're pressure-sensitive!

■ Self-adhesive Avery Labels are quick, clean and neat... there's no mess, no fuss, no sticky fingers. Combined with patented Avery dispensers, they'll speed and simplify your labeling—and production! They're laid right on your product —*without moistening.* They'll put your trade mark on that hard-to-label surface...put a warning sticker or wiring diagram on your product or any clean, smooth spot. For inspection stickers...color coding...guarantees—they'll really speed production, packaging or any labeling or marking job!

■ Available in sheets or rolls...in any size, shape or color. Write for case histories and FREE SAMPLES—*today!*

AVERY ADHESIVE LABEL CORP., custom div. 123
117 Liberty Street, New York 6 • 608 South Dearborn Street, Chicago 5
1616 S. California Ave., Monrovia, Calif. • Offices in other Principal Cities

☐ Send us case histories & free samples
☐ Tell us about your dispensers
☐ Have the Avery Label man call

Name_____
Company_____
Address_____
City_____ State_____

When inquiring check CP 4297 on handy form, pgs. 2-3

Particularly for hygroscopics, bag also shows resistance of polyethylene . . .

sheet coated with combination of polyethylene and wax is incorporated in multiwalls

Packaging sheet coated with a combination of polyethylene and wax has been developed for use in multiwall bags. Tests indicate that the sheet, called Poly-Kote is equally acid and alkali resistant as straight polyethylene. In addition it is well suited for packaging hygroscopic materials such as resins, chemicals, fertilizers.

During a calcium chloride moisture-pickup test, one sample of calcium chloride was packaged in an asphalt-laminated bag to provide a moisture-vapor barrier. Other sample was placed in a Poly-Kote bag. Both samples were placed in a humidity cabinet at 100°F and 90% RH for a period of one month. Photo shows results — Poly-Kote bag is on right.

(Packaging sheet is a development of Arkell & Smiths, Dept. CP, 500 Fifth Ave., New York, N. Y. . . . or for more information check CP 4298 on handy form, pages 2 and 3.)

Offer package testing service to certify in accordance with Armed Forces

Service for testing and certifying packaging in compliance with recently adopted policies of Armed Forces is being offered. Service is designed for contractors and it is said that company can perform tests and certify in compliance with Specification MIL-P-116 at lower cost than contractor can do job himself.

(Package testing service is offered by Webhart Corporation, Dept. CP, 33 W. Union St., Pasadena, Calif. . . . or for more information check CP 4299 on handy form, pages 2 and 3.)

Yes, we DO mean to be Personal

THAT IS, to the extent of giving you the personal recommendations of key men long experienced in adapting Multiwall Shipping Sacks to the exacting needs of a very wide variety of commodities. . . .

of men who realize that thoroughly protective packaging for shipping and storing is a *must* . . .

of men who are capable of making decisions on the spot and upon whose promises of delivery you can depend.

Raymond men are no mere order-takers; they consider your needs from every aspect including sensible economies and clean, sharp, colorful printing for personalizing your package.

May we discuss these matters with you?
THE RAYMOND BAG COMPANY,
Middletown, Ohio. Phone 2-5461

Raymond
MULTIWALL PAPER SHIPPING SACKS

When inquiring check CP 4300 on handy form, pgs. 2-3

SCREENING NEWS

Helpful information on screening and separating operations ...from field reports of **SWECO SEPARATOR** *District Engineers*

3-way use of Sweco Separators in milling cotton seed oil

The SWECO District Engineer from New Orleans reports successful use of SWECO Vibrating Screen Separators in processing cotton seed oil. Phase one: Screening out impurities and foreign matter from seeds as received from the gins. Phase two: separation of the meat from the seed hulls. Phase three: screen separation of the foots from the hot oil. Details on request.

Eagle-Picher Company saves $75 per day with two SWECOS

The Eagle-Picher screening problem: recovery of saleable material during processing of diatomaceous earth, at its Clark Station, Nevada plant. Recommendation of the SWECO District Engineer: installation of two Model C-2D-8 SWECO Vibrating Screen Separators. Results: savings of $75 per day on a 24 hour, 6 day week operational schedule. Savings represent recovery of saleable material formerly lost. Customer comment: "In 2 years of continuous operation, no motor failure — practically no maintenance — screen life exceptional and beyond expectation."

Casein through 94 mesh at 800 lbs/hour

An Eastern chemical firm called in their local SWECO Engineer on the problem of screening 600 to 800 lbs./hour of casein through 80 mesh cloth. The desired throughput was attained with one 48 Inch SWECO Model A-1D-8 Vibrating Screen Separator, with 94 mesh stainless steel cloth.

SEND FOR BULLETIN NO 45-3

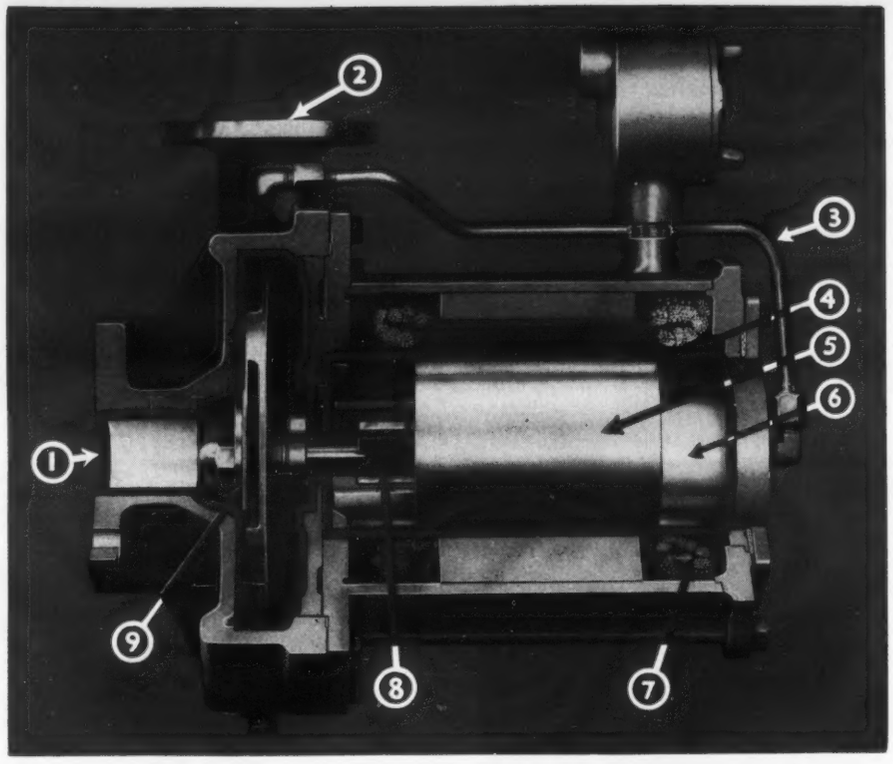
Detailed information on applications of SWECO Screen Separators.

SWECO SEPARATORS

SOUTHWESTERN ENGINEERING COMPANY
4800 Santa Fe Ave., Los Angeles 58
LOgan 8-6262—Cable: SWECOLA

Engineers and Constructors . . . Manufacturers

When inquiring check CP 4301 on handy form, pgs. 2-3



At the Avon Lake Experimental Station of the B. F. Goodrich Chemical Co. . . .

sealless pumps lick tough leakage problems

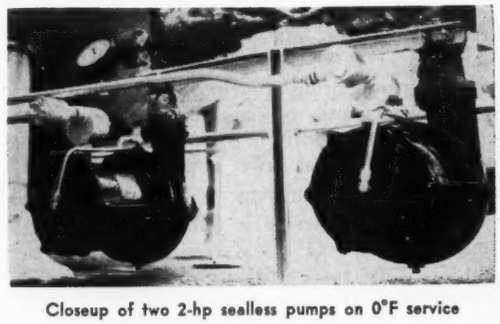
Versatility, ruggedness of sealless pumps displayed in operation where everything but the problems are scaled down

NEVETT S. GROVE, Engineer
Avon Lake Experimental Station
B. F. Goodrich Chemical Co. Avon Lake, Ohio
with **RICHARD J. CALLAHAN,** Assistant Editor

In pilot plant operations at the Avon Lake Experimental Station of the B. F. Goodrich Chemical Co., sealless pumps have displayed both versatility and ruggedness.

In one particular process that was being developed, it was found that small centrifugal pumps (in the 5 gpm or less class) had inadequate seals. One man was kept busy just maintaining pump seals. Liquid polymerized between the seal faces forming a hard crystal which rapidly ground out the carbon. Flushing system with double rotary seals was not possible because of product contamination.

Several solutions to the problem were worked out in the Avon Lake maintenance shops with special designs and fabrications. These solutions were only temporary, however. What was really wanted was



Closeup of two 2-hp sealless pumps on 0°F service

Chempump design and operation

Design combines construction of pump and motor and allows pumped fluid to enter rotor chamber of motor. No shaft seal or stuffing box is needed, since pump impeller and rotor are an integral unit, surrounded by pumped fluid. Stator section of motor is isolated from fluid by non-magnetic, corrosion-resistant alloy liner. Tube connected between high and low pressure ends of pump circulates approximately ½ of one percent of total fluid pumped through bearings and around rotor. Thus rotor, stator windings and bearings are properly cooled. If slurry is being pumped, a clear back flush of mother liquor or other compatible liquid is fed to rear of pump.

1. Suction
2. Discharge
3. Circulating tube
4. Stator liner
5. Rotor
6. Rear bearing
7. Windings
8. Front bearing
9. Impeller

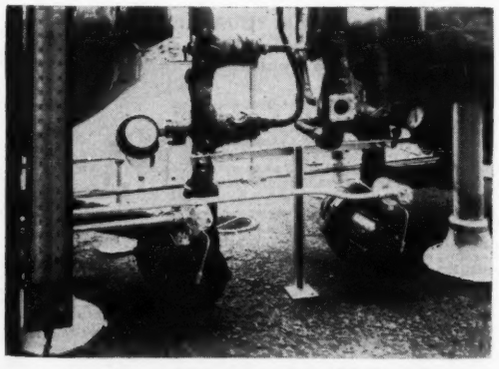
a practical answer which would work anywhere in the process. Goodrich wanted commercial equipment which could be used when the process went into production full-scale.

It was decided that a sealless pump of some description would be the best answer. Consequently, Chempumps were introduced into the pilot plant operations at that stage. The first sealless pumps tried were satisfactory hydraulically, but O-ring seals used in these early models gave trouble.

When the new welded construction pumps were installed, problem fluids were handled without failure or leakage of any kind.

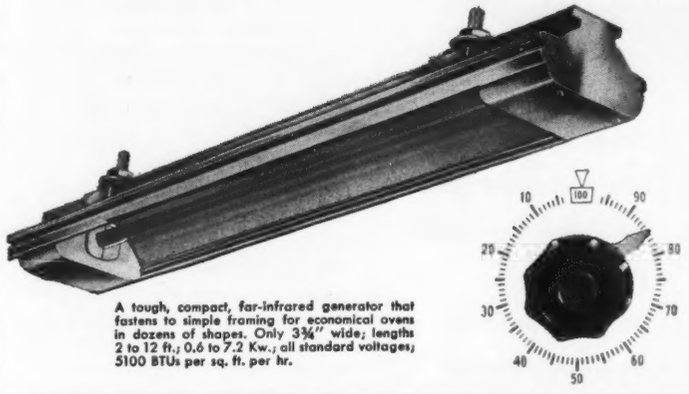
This successful application led to a variety of other applications. In critical vacuum operations intermittant loss of prime was experienced. This was

(*Continued on page* 171)

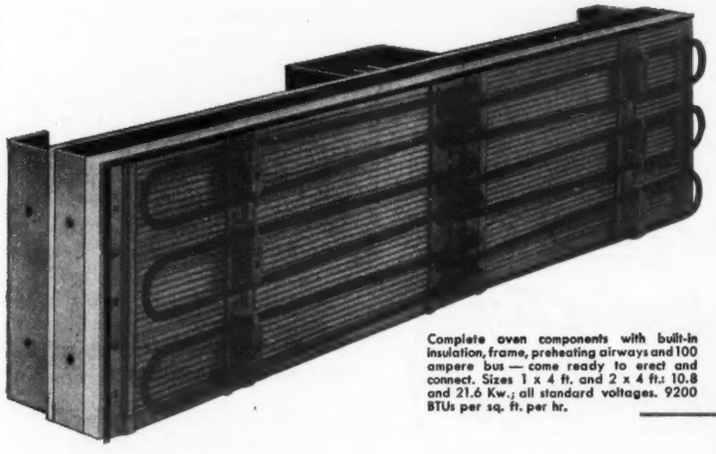


Outside installation of two 2-hp Chempumps

uniform heat . . .
precise heat . . .
fast heat . . .
"color blind" heat . . .



A tough, compact, far-infrared generator that fastens to simple framing for economical ovens in dozens of shapes. Only 3¾" wide; lengths 2 to 12 ft.; 0.6 to 7.2 Kw.; all standard voltages; 5100 BTUs per sq. ft. per hr.



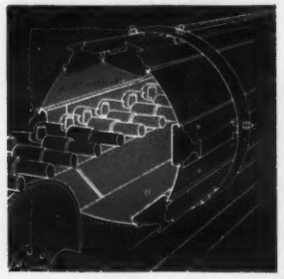
Complete oven components with built-in insulation, frame, preheating airways and 100 ampere bus — come ready to erect and connect. Sizes 1 x 4 ft. and 2 x 4 ft.; 10.8 and 21.6 Kw.; all standard voltages. 9200 BTUs per sq. ft. per hr.

A Chromalox Electric Radiant Panel or Chromalox Radiant Heater installation gives you a quick, low-cost answer to your baking, curing, drying and other heating needs. Pre-engineered units allow on-the-spot erection and connection. You get up to 700° F. work temperatures; absolutely uniform radiation with no hot and cold spots; high intensity heat that's absorbed *f-a-s-t* by all colors; and accurate "dialed" heat from 0 to 100% of capacity.

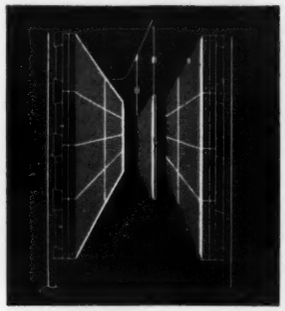
CHROMALOX *Electric*
Far-infrared Units

TWO JOB-PROVED FAR-INFRARED TYPES TO CHOOSE FROM!

You'll find Chromalox pre-built Radiant Panels and Heaters from stock fit your jobs and your budget. Shown below are just two of the literally hundreds of oven shapes and sizes which can be erected quickly and easily using Chromalox Electric Radiant Units.



Conveyorized oven built on the job using Chromalox Radiant Heaters. Units are installed in lengths and ratings needed to fit the work. Input controller gives precise and exact temperatures easily adjusted to meet varied processing requirements. Easy to assemble, easy to wire.



Chromalox pre-engineered Radiant Panels are easily and quickly erected and connected to form ovens and drying tunnels of any size and shape. An oven such as sketched may be installed in 20 to 30 man-hours with minimum engineering expense and lowest cost per installed kilowatt.

Have a Problem Involving Degreasing, Drying, Baking, Preheating, Curing?

The assistance of Chromalox Application Engineers is yours for the asking. They'll help you work out your specific requirements without obligation. Write today.

EDWIN L. WIEGAND CO. IC-70
7517 Thomas Blvd., Pittsburgh 8, Pa.
I'm interested in electric heat for.....
.....
.....
☐ Send me Bulletins on Far-infrared units.
☐ Have a Chromalox Application Engineer get in touch with me.
Name.....
Company.....
Street.....
City.....Zone.....
State.....

When inquiring check CP 4302 on handy form, pgs. 2-3

For identification uses — permanently etched aluminum foil . . .

destruction of .003" plates is difficult

Uses: Permanent identification of equipment or trademarking and general product labeling.

Features: Identification plates are anodized and dyed, etched aluminum foil. They are applied as easily as the familiar "decal", and last as long as product to which they are affixed. Colors are permanent.

Description: Plates, called Metal-Cals, are of lightweight, flexible stock, and may be applied to thin product material and curved surfaces of almost any radius. Plates are only .003" thick, making destruction difficult. They may be die cut to any desired shape or size to conform, for instance, to corporation trademarks. Any size type or fine-line detail is clearly and accurately reproduced.

(Identification plates are a product of C & H Supply Company, Dept. CP, 415 E. Beach Ave., Inglewood 3, Calif. . . . or for more information concerning manufacturer's product check CP 4304 on handy form, pages 2 and 3.)

Describes complete line of power transmitters

Brief but informative descriptions of company's line of power transmission equipment are included in four-page bulletin. Units illustrated include V-belt drives, speed-reduction drives, adjustable-speed sheaves, steel split pulleys, conveyor pulleys, motor bases, backstops, and collars and shaft hangers.

Bulletin on power transmission equipment is available from The American Pulley Company, Dept. CP, 4200 Wissahickon Ave., Philadelphia 29, Pa. When inquiring reader may simply specify CP 4305 on the convenient Reader Service slip which is located between pages 2 and 3.

Put Super-Silvertop

HEAT-KWIK STEAM TRAPS

ON ALL PRODUCTION UNITS

- Cooking Vessels
- Ironers and Laundry Presses
- Dryers and Drying Tumblers
- Autoclaves
- Steam Jacketed Kettles
- Dry Cleaning Equipment
- Unit Heaters and Heating Surfaces
- Paper Making Machines
- Blast Coils

The Fastest Air Venting Trap Money Can Buy!

Heat-Kwiks heat up production units in 2½ minutes. Ordinary inverted bucket traps heat up production units in 20 minutes.

FREE NEW Heat-Kwik Bulletin. Mail Coupon Below.

HEATING TIME REQUIRED

THE V. D. ANDERSON COMPANY
1932 West 96th Street • Cleveland 2, Ohio

Gentlemen: Please send me the new Heat-Kwik catalog without obligation.

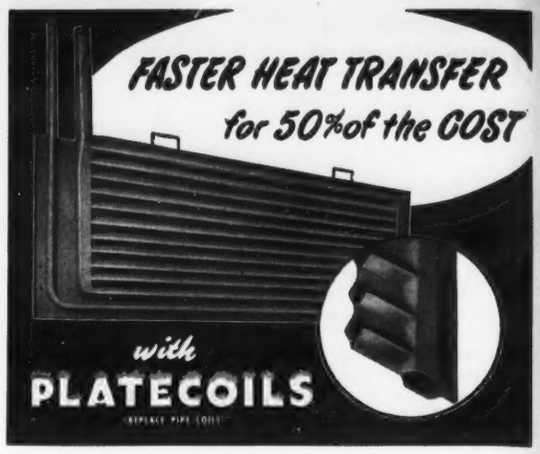
Name ..... Title .....

Company .....

Address .....

City ..... State .....

When inquiring check CP 4303 on handy form, pgs. 2-3



A Platecoil has more heat transfer area than a pipe coil twice its size. Thus it takes only half as much Platecoil to heat a given area. You have 50% less steel to pay for so you can save nearly 50% in initial cost. The Platecoil takes only half as much space in the tank. The greater BTU transfer per unit area of Platecoil also means faster heating or cooling. Platecoils require less maintenance and can be removed without dumping the solution.

Send for complete technical manual and descriptive Bulletin No. P54

PLATECOIL Division Tranter Mfg. Inc. LANSING 4, MICHIGAN

When inquiring check CP 4306 on handy form, pgs. 2-3

thousands of users PROVE "HI-TEMP" C-5 THREAD COMPOUND IS BEST FOR ALL STUD THREADS and STAINLESS STEEL APPLICATIONS

✔ speeds up dis-assembly time
✔ prevents stud breakage
✔ eliminates pitting of stainless steel

NO MORE FROZEN OR GALLED STUDS EVEN AT 1800° F

Let us SEND you a FREE SAMPLE so you can PROVE to YOURSELF that C-5 will lick your toughest stud breakage problems!

To assure easy maintenance on products having threaded assemblies many leading product engineers have specified the use of Fel-Pro C-5 as an anti-seize coating on stud threads prior to final production line assembly.

Fel-Pro's exclusive Colloidal-Copper formula allows for easy separation and reduces stud breakage of threaded assemblies after long exposures to extreme temperatures. It eliminates pitting of stainless and alloy steel even where dissimilar metals are joined.

Conduct your own tests with C-5 "Hi-Temp" at our expense. Write on your company letterhead for Free Sample and complete data sheet TODAY!

FELT PRODUCTS MFG. CO. 1515 Carroll Ave., Chicago 7, Ill

When inquiring check CP 4307 on handy form, pgs. 2-3

FASTER, EASIER, MORE EFFICIENT CLEANING...

for 2½ cents per gallon

Whether the job calls for cleaning heavy duty tanks of metal, plastic and glass lined, or cleaning general equipment, Alconox combines power with the gentleness that spells SAFELY CLEAN.

Compounded from numerous different chemicals Alconox is blended into a fast acting multiple cleaning detergent that meets your cleaning needs every time—and at 2½ cents per gallon.

Used by leading industrial firms who found it better for such varied uses as cleaning ball bearing assemblies, optical lenses and industrial glass piping systems, after recommendations by their own research departments.

ALCONOX outsells because it outperforms

Literature, Samples and the name of your nearest distributor upon request.

For specific problems write or call our Technical Department

AVAILABLE IN

BOX of 3 lb. .....$ 1.95
CARTON of 12 boxes of 3 lbs. ... 18.00
DRUM of 25 lbs. .....lb. .45
DRUM of 50 lbs. .....lb. .40
DRUM of 100 lbs. .....lb. .40
DRUM of 300 lbs. .....lb. .37

(Slightly higher on Pacific Coast)

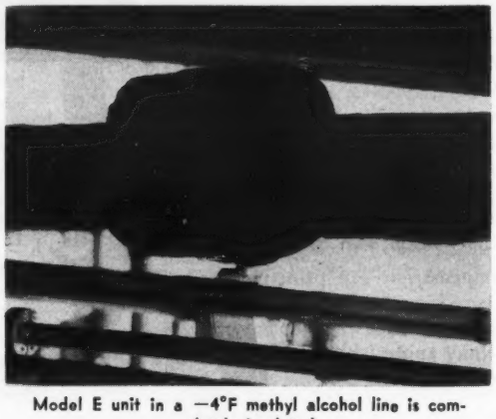
ALCONOX, INC., 61-63 Cornelison Ave., Jersey City 4, N. J.

When inquiring check CP 4308 on handy form, pgs. 2-3

(*Continued from page* 169)

due to air being drawn in through packing glands or seals. Sealless construction eliminated this difficulty completely.

Another application pump was made in a −4°F methyl alcohol line as a pressure booster. For this application a Model E unit (see CHEMICAL PROCESSING for April, p. 156) was used. This pump is located in a straight run and is completely covered with insulation.



Model E unit in a −4°F methyl alcohol line is completely insulated

There is another advantage in using the sealless pump. Adaptable to direct mounting to vessel nozzles, the pump needs no special foundations. By not requiring foundations or motor coupling, problem of strains from piping and misalignment is eliminated.

So far, maintenance has been no problem. Bearing life has been excellent and Teflon envelope gaskets are holding up well. Although higher in cost than conventional centrifugal pumps, the service the sealless pumps have given, is felt to more than justify the higher initial equipment outlay.

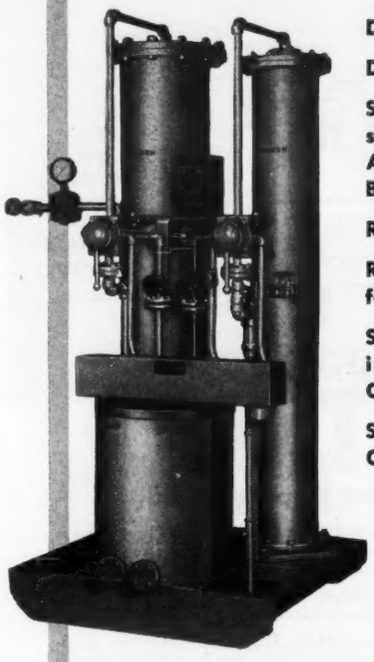
(Sealless pumps are a product of the Chempump Corp., Dept. CP, 1300 E. Mermaid Lane, Philadelphia 18, Pa. . . . or for more information check CP 4309 on handy form, pages 2 and 3.)

Recommends use and care of swing joints

General information and detailed specifications on 35 styles of bronze and steel, plain and flanged swing joints are included in 12-page catalog. Recommendations on use, care, and maintenance of equipment are given.

Cat F-8 is issued by OPW Corp., Dept. CP, 2735 Colerain Ave., Cincinnati 25, Ohio. When inquiring reader may simply specify CP 4310 on handy form, pages 2 and 3.

PRACTICAL APPLICATIONS OF ION EXCHANGE



Demineralization of Water

Deacidification of Solutions

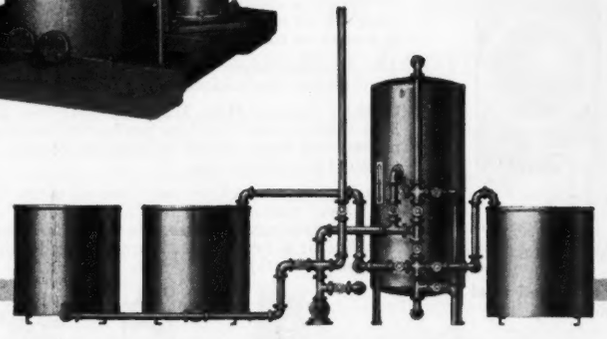
Selective Removal of Troublesome Constituents from Chromic Acid, Plating and Anodizing Baths

Recovery of Valuable Metals

Removal and Recovery of Offending Ions in Waste Waters

Selective Removal of Contaminants from Chromic Acid Copper Stripping Solution

Substitution of Anions and Cations in Solutions



Get Details from INDUSTRIAL

The success stories of ion exchange are not isolated cases. All through industry in a wide variety of applications, ion exchange is effecting substantial cuts in costs, more uniform products, and a new ease in process control.

Here are a few suggestions for you to check against your own processing. INDUSTRIAL is glad to give you the benefit of its experience if you will outline your requirements. An estimate of probable savings, production, approximate costs, and the equipment required will enable you to know what ion exchange can do for you. 4946

INDUSTRIAL FILTER & PUMP MFG. CO.

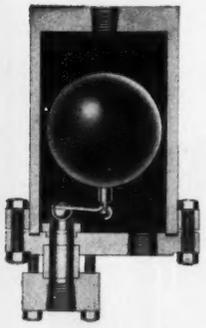
5908 Ogden Avenue • Chicago 50, Illinois

PRESSURE FILTERS
DEMINERALIZERS
RUBBER LININGS
HEAT EXCHANGERS
CENTRIFUGAL PUMPS

When inquiring check CP 4311 on handy form, pgs. 2-3

MAXIMUM EFFICIENCY for...

Clark Duo-Step
FLOAT TRAPS



• Fabricated steel float trap

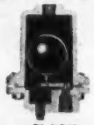
Clark Float Trap Series 450-D

As indicated above, the Clark 450-D Float Trap is designed to maintain 3-way control over liquids in transit or storage.

The illustrations show how the Float Trap is used for different applications.

Clark is the *only* Float Trap that offers the Duo-Step feature—two fulcrum points for maximum power and valve travel without increasing the physical size of the trap.

The Duo-Step 450-D is only one of many traps and valves manufactured by Clark for every control and drainage purpose. See your Clark representative or distributor . . . or write us direct for the complete story.



CLARK AIR TRAP No. 440

CLARK VENTING TRAP No. 244 V

CLARK "Y" STRAINER

THE HOME OF DUO-STEP LEVERAGE
Clark
MANUFACTURING COMPANY
1830 EAST 38th STREET
CLEVELAND 14, OHIO
Distributors and Representatives in all major cities

When inquiring check CP 4312 on handy form, pgs. 2-3

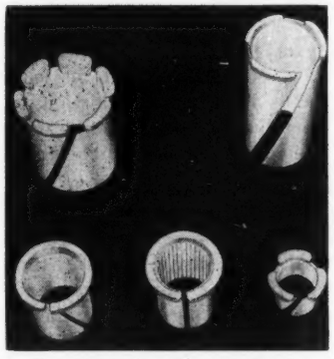
Flange on nylon bearing gives axial retention, permits end thrust . . .

compensation gap allows for expansion and contraction

Design of nylon bearing incorporates a flange which has two main purposes: to permit bearing to carry end thrust against a shoulder in addition to radial loads; and to afford means of axial retention of bearings in at least one, and in some cases both directions.

On these bearings, which are used primarily to eliminate lubrication and increase bearing life, a continuous flange can be provided which is interrupted only at the compensation gap.

Compensation gap principle permits circumferential expansion and contraction of nylon material without appreciably affecting bore diameter.



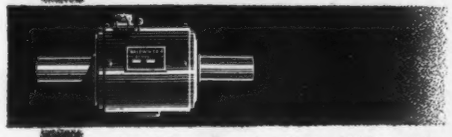
Flanges can be either continuous or interrupted

In most cases an interrupted or clover leaf flange is used which precludes slight distortion of bearing which might result from gradual release of internal stresses in flange.

Bearings with either flange can be provided with an anti-rotation boss or lug under flange which engages a notch or slot in bearing housing.

(Flanged nylon bearings are a product of Engineering Department, Thomson Industries, Inc., Dept. CP, Manhasset, New York . . . or for more information check CP 4313, pages 2 and 3.)

Ultra-sensitive SR-4® Torquemeter speeds design of more efficient engine air cooling systems



Dean & Benson Research engineers get highly accurate measurement of minute power changes with a Baldwin SR-4 Torquemeter . . . a big assist in designing more efficient engine air cooling systems. Why not investigate the many ways you can use SR-4 devices for fast, accurate, economical measurement of torque, load or fluid pressure? Send today for our latest bulletins! Address Department 3406, Baldwin-Lima-Hamilton Corp., Philadelphia 42, Pa.

BALDWIN-LIMA-HAMILTON
Philadelphia 42, Pa. • Offices in Principal Cities
In Canada: Peacock Bros., Ltd., Montreal, Quebec

When inquiring check CP 4314 on handy form, pgs. 2-3

NO RODDING NECESSARY!

Strahman
RAM TYPE Drain Valves

The Only Drain Valve That Cannot Clog Up!

In the closed position the piston or ram extends up into the tank, preventing plugging of the outlet.

In the open position with piston fully retracted, there is no resistance to flow of materials drained from the tank.

Made in any cast metal to meet your requirements.

Designed for bolting to existing flanges. For special adaptations and for jacketed vessels, adaptor pads are available.

Full Specifications on Application

STRAHMAN VALVES, INC., 16 HUDSON STREET NEW YORK 13, U.S.A.

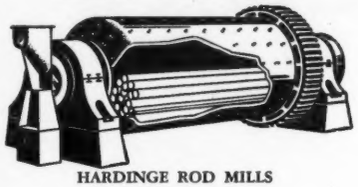
When inquiring check CP 4315 on handy form, pgs. 2-3

GRINDING MILLS
for every application

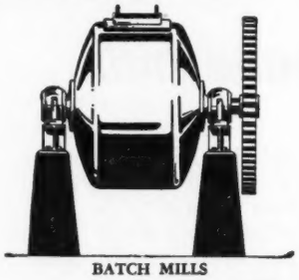
HARDINGE CONICAL MILLS

TUBE MILLS

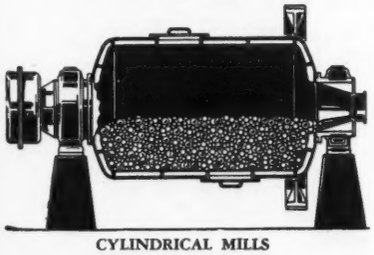
HARDINGE TRICONE MILLS



HARDINGE ROD MILLS



BATCH MILLS



CYLINDRICAL MILLS

Write for Bulletin AH-440-13

HARDINGE
COMPANY, INCORPORATED
YORK, PENNSYLVANIA · 240 Arch St. · Main Office and Works
New York · Toronto · Chicago · Hibbing · Houston · Salt Lake City · San Francisco

When inquiring check CP 4316 on handy form, pgs. 2-3

Elements entering pressure system aren't damaged by seal . . .

packing gland employs soft sealant materials designed for various conditions

Uses: Pressure sealing entry of thermometers, thermocouple wells, pitot tubes, static pressure probes, round rods or tubes, in process control, pilot plant, laboratory, and experimental applications.

Features: Packing gland is designed to provide a pressure seal without damage to a tube or other round element entering a pressure system. This is accomplished by compressing a soft sealant material around tube to form a positive, leak-tight joint. Typical sealant materials include Teflon, asbestos-graphite, and Lava.

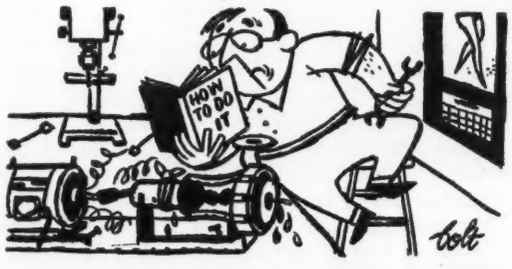
Packing gland is made of Type 303 stainless steel

When Lava is used as sealant, gland has a maximum temperature range exceeding 1500°F.

Description: Model PG-5 packing gland is made of Type 303 stainless steel for maximum corrosion resistance. Since a seal can be formed at any point along length of tube, depth of immersion is completely adjustable and can even be varied without loss of system pressure.

Gland is made with standard bore diameters of ½, ⅝, and ¾" IPS.

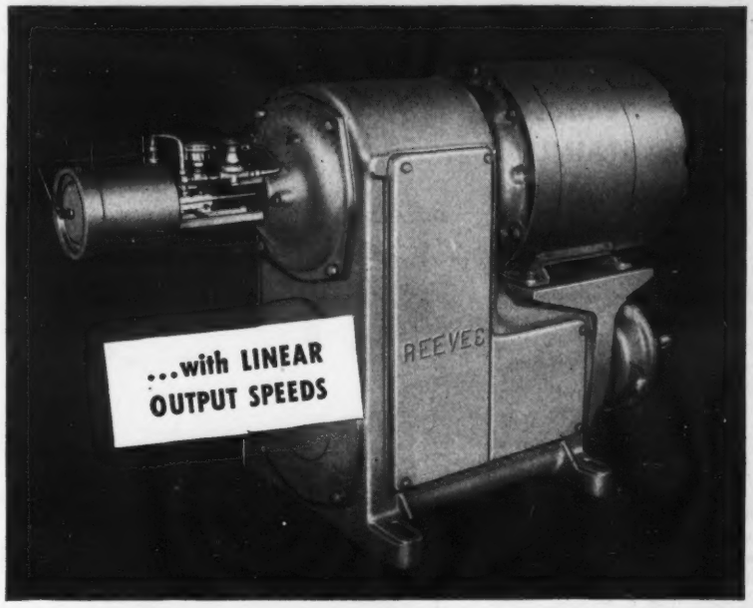
(Packing gland is a product of the Conax Corporation, Dept. CP, 4515 Main Street, Buffalo 21, N. Y. . . . or for more nformation check CP 4317 on handy form, pages 2 and 3.)



Your guide to more ideas concerning Engineering and Maintenance . . .

is the handy Product Directory on page 199 to 201. All products and services discussed in this issue, in either editorial or advertising, are listed there — in alphabetical order for your convenience.

New *Automatic Speed* Control for Continuous Processing



REEVES
Auto-Pneumatic Control

• Now with the REEVES Vari-Speed Motodrive equipped with the new sensitive Auto-Pneumatic control, you can automatically control continuous processes involving the regulation of heat, liquid level, pressure, temperature, flow, and many other variables. Positive, direct connection from the pneumatic instrument to the Auto-Pneumatic control assures accurate and sensitive speed regulation.

Exclusive REEVES cam design provides linear output speeds so necessary for delicate proportioning processes . . . maintains the greatest accuracy while regulating or maintaining any speed throughout the range of the Motodrive.

REEVES Auto-Pneumatic Control assures maximum efficiency and economy in industrial processes . . . means outstanding savings for you in material, fuel and labor costs plus continuous uniformity of your product or process. Write today for complete information.

REEVES PULLEY COMPANY · COLUMBUS, INDIANA

Send today for
BULLETIN CP13b-M542

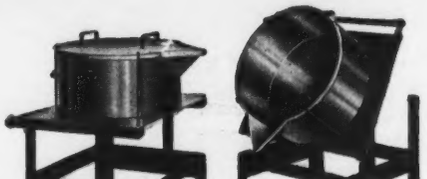
When inquiring check CP 4318 on handy form, pgs. 2-3

KIRK AND BLUM SPECIALISTS IN SHEET METAL FABRICATION

. . . STEEL
. . . STAINLESS
. . . MONEL
. . . ALUMINUM

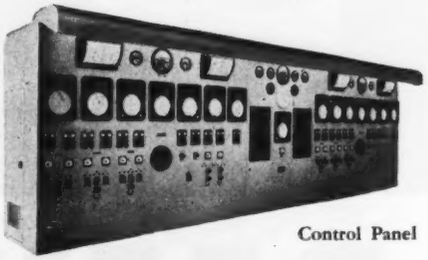
With 47 years of experience in the field, KIRK & BLUM offers quality workmanship and economical fabrication of sheet metal equipment made to your individual specifications.

Complete facilities and special equipment are maintained for the fabrication of all sheet metals (to ½") and light structurals. Kirk & Blum are specialists in copper, aluminum, monel, stainless and other alloy fabrication. For a prompt quotation, send prints and details to: The Kirk & Blum Mfg. Co., 3133 Forrer St., Cincinnati 9, Ohio.

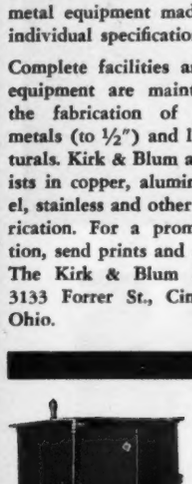


Aluminum Pouring Kettles

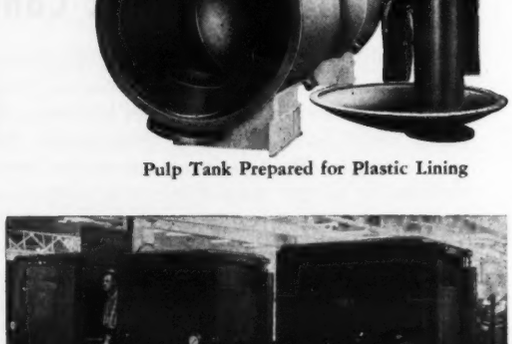
Control Panel



Pulp Tank Prepared for Plastic Lining



Liquid Truck with Sluice Gate



Industrial Ovens and Dryers

Write for this literature:

- Sheet and Plate Fabrication
- Custom Built Electrical Enclosures

THE KIRK AND BLUM MFG. COMPANY

3133 FORRER ST., CINCINNATI 9, OHIO

When inquiring check CP 4319 on handy form, pgs. 2-3

Original grout used in 1944 in installing this heavy crusher is still in excellent condition in spite of tremendous weight of unit and vibration caused by grinding action inside

Without a shutdown for regrouting in 10 years, non-shrink mortar —

supports 20,000 pound mill

Large chemical company in the Midwest has crushed more than 175,000 tons of phosphate rock with machine

Problem: When heavy pulverizing equipment was installed at a large chemical company in the Midwest, a dependable method of supporting the mill was required. Mortar used had to be able to withstand the tremendous weight of the crusher as well as the vibration caused by the grinding action inside unit. Any shutdown to regrout the machine would be costly from the viewpoint of the actual cost of regrouting, as well as possible damage to equipment and lost production time.

Mill is used to grind phosphate rock at the company. Ground phosphate rock is then treated with sulfuric acid and becomes the basic ingredient for the fertilizer produced.

Solution: Mill shown in accompanying photograph was installed in 1944. Product known as Embeco was used as the grouting material to make non-shrink mortar that would support the 20,000 pound weight of the pulverizer.

Embeco is a specially prepared aggregate for use with Portland cement and sand. Material consists of 75% graded chemical iron, free from oil and non-ferrous metals, combined with a cement dispersing agent, oxidizing and accelerating agents. Usual grouting mixture consists of one part Embeco, one part Portland cement, and one part sand.

Reason material is well suited for grouting heavy equipment, besides its non-shrinking property, is that is has high compressive strength and is ductile. Ductility is imparted to the grout by the iron. During the setting period, the iron particles expand through oxidation and overcome

the inherent shrinkage of the cement mortar. Expansion of the iron particles produces a void-filling, compacting action and thus an extremely dense grout. Mortar has high early and ultimate strength and absorbs pounding and vibration without crumbling. Installation was serviced by the company furnishing the grouting material. This is considered to be an important point in the success of the project since material must be used properly.

Mill is a self-contained unit that takes phosphate rock ¾ to 1" in size and grinds seven tons per hour to a fineness of 90% passing a 60 mesh screen. Grinding action is that of three rolls being revolved around and against a die ring. Pressure of approximately 15,000 psi created between rolls and die pulverizes the material to desired fineness.

Results: Mill has been in operation for 10 years without a shutdown for regrouting. Original grout made with non-shrink mortar is in excellent condition. Mill has been in operation for more than 25,000 hours, during which time it has crushed more than 175,000 tons of phosphate rock.

(Embeco grouting compound is product of The Master Builders Co., sub. of American-Marietta Co., Dept. CP, 7016 Euclid Ave., Cleveland 3, Ohio . . . or for more information check CP 4320 on handy form, pages 2 and 3.)

(Junior Hercules Mill is manufactured by Bradley Pulverizer Co., Dept. CP, Allentown, Pa. . . . or check CP 4320A on handy form, pages 2 and 3.)

Offer voluntary test program for reinforced plastics manufacturers

Reinforced plastics manufacturers interested in selling to the Navy Dept. can benefit by company's testing program. Organization has been engaged to study all thermosetting reinforced plastic materials available for ammunition cases and similar uses.

Results of this survey and test program will be twofold: 1) to develop a general performance specification for reinforced plastic ammunition cases, and 2) to organize a qualified products list based on manufacturers whose materials meet minimum requirements for performance specification. Those manufacturers who wish to participitate in program may submit coded materials for inspection. Those materials that meet the battery of tests will be placed on qualified products list.

(Plastic testing program is being conducted by Engineering Dept., Foster D. Snell, Inc., Dept. CP, 29 West 15th Street, New York 11, N. Y. . . . or for more information reader may simply check CP 4321 on the convenient Reader Service slip which is located between pages two and three.)

Knife-edge Rotary Action of the acf Cylindrical Plug Valve clears obstructions, eliminates stoppages, insures constant flow.
Head Leakage Control vital to maximum dependability is assured on acf Cylindrical Plug Valves by a specially designed TEFLON® GASKET.
TEFLON IS A DUPONT PRODUCT
QUALITY THAT PAYS OFF
Split-second Control Quick, quarter turn shut off on acf Cylindrical Plug Valves satisfies rigid control requirements in the petroleum, natural gas and processing industries.
Unobstructed Flow acf Cylindrical Plug Valves have a port opening the same area as the pipe itself.

Rectangular Port and Full Round Port

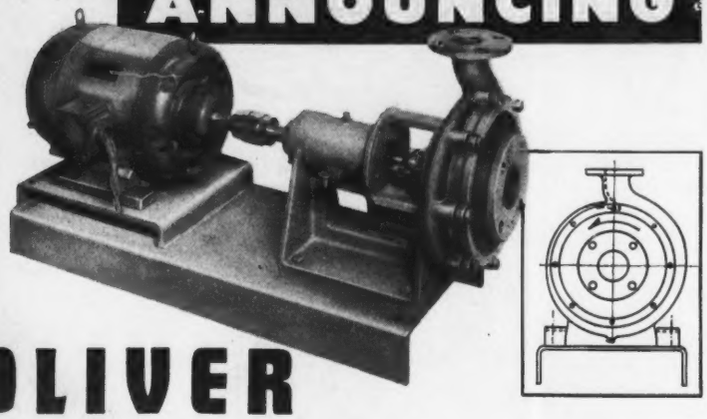
acf CYLINDRICAL FULL PIPE AREA PLUG VALVES

Representatives in 50 Principal Cities

Write for descriptive Catalog 5-CP to acf Industries, Incorporated, Valve Division, 1501 E. Ferry Avenue, Detroit 11, Michigan.

When inquiring check CP 4322 on handy form, pgs. 2-3

ANNOUNCING



OLIVER

TYPE L CENTRIFUGAL PUMP

Corrosion Resisting

STAINLESS STEEL • BRONZE • CAST IRON

Should you ask "What, in your opinion, is the outstanding feature of your Type L Pump?", we would probably point to the high cut water, as illustrated in the drawing. This one feature alone contributes materially to the high capacity and smooth operation of the pump. It minimizes the formation of air pockets and permits ready priming. It often permits better piping arrangements.

The Oliver Type L Centrifugal Pump comes with three choices of 'contact' parts—#316 stainless steel, bronze, and cast iron. You have three choices of shaft seals: conventional stuffing box with packing; Oliver Carbon Seal; or John Crane #9 Mechanical Seal. Impellers are 6 vaned, semi-open and port-free, making them suitable for handling vacuum filter filtrates as well as for straight pumping jobs. Present size is 2 inches; other sizes under development and ready shortly.

In writing for further details (Bulletin 310-T) tell us about your problem. It will help to expedite matters for you.

We have two other pumps that may be of interest: Olivite (Centrifugal Type) Acid Handling and ODS (Diaphragm Type) Slurry Handling. So, regardless of the product to be handled we could have the best pump for your requirements. Why not find out? We know pumping, having made pumps for close to 40 years.

WORLD WIDE SALES, SERVICE AND MANUFACTURING FACILITIES

OLIVER UNITED FILTERS OUF INC.

NEW YORK 36—33 West 42nd Street • CHICAGO 1—221 North LaSalle Street
OAKLAND 1—2900 Glascock Street • SAN FRANCISCO 11—260 California Street
International Sales Office—New York • Cable—OLIUNIFILT

FACTORIES: Hazleton, Pa Oakland, Calif

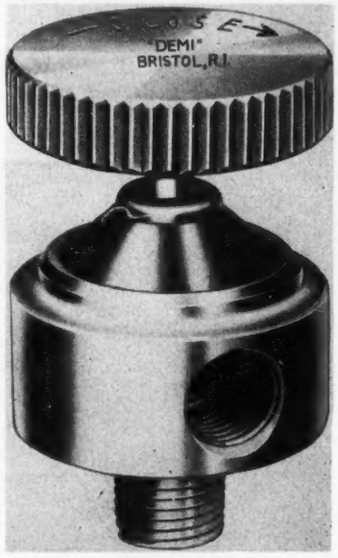
When inquiring check CP 4323 on handy form, pgs. 2-3

Packless angle valve has female outlet, male inlet . . .

unit in steel has ratings as high as 1500 psig

Male inlet and female outlet connections are featured on packless angle valve. This design, Demi Model AM, as well as others, can be equipped with panel mounted bonnets, tee handles or round handles, toggle actuated, or with diaphragm operators for remote control.

In brass and aluminum, valve is rated for vacuum or 750 psig. In steel or stainless steel, it is rated for vacuum or 1500 psig.



Valve can be furnished with neoprene diaphragm for 300 psig service

Valve is normally supplied with an integral seat, SS diaphragm and Teflon gasket. These valves can also be furnished with neoprene diaphragm for 300 psig service.

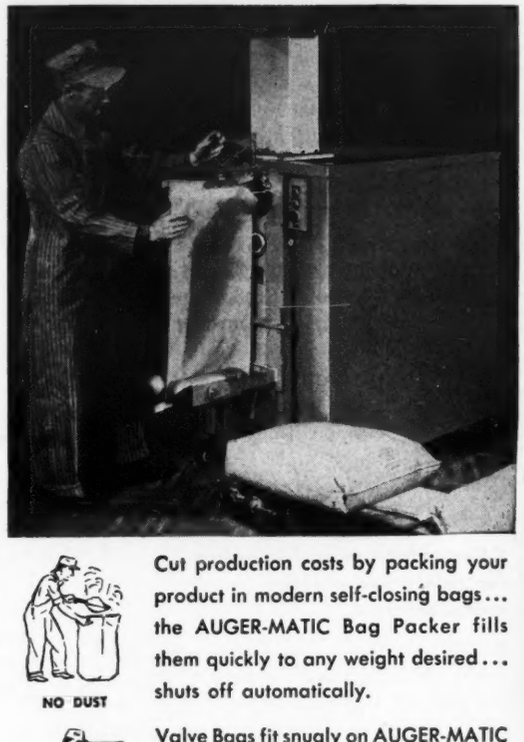
Packless construction is also supplied in straight-through design with multiple ports or in a two- or three-valve manifold in brass, aluminum, steel, and 303 SS.

(Packless angle valve is a product of G. W. Dahl Company, Inc., Dept. CP, 430 High St., Bristol, Rhode Island . . . or check 4323A, pages 2 and 3.)

CUT COSTS
Pack Chemicals in VALVE BAGS with

AUGER-MATIC

Fills and Weighs... All in *One* Operation



NO DUST

Cut production costs by packing your product in modern self-closing bags... the AUGER-MATIC Bag Packer fills them quickly to any weight desired... shuts off automatically.

NO WEIGHING

Valve Bags fit snugly on AUGER-MATIC spout so no dust escapes . . . keeps bags clean . . . eliminates costly tieing or bag closing equipment.

NO SEWING . . . NO TIEING

AUGER-MATIC Bag Packer is equipped with multi-twist auger . . . packs any materials from powder to pellets. Easily moved from one filling point to another.

Send for descriptive literature

E. D. CODDINGTON MFG. CO.
5036 North 37th Street • Milwaukee 9, Wisconsin

When inquiring check CP 4324 on handy form, pgs. 2-3

Brief histories on applications of small refrigeration units

As examples of industrial application, brief histories on use of small refrigeration machines are given in four-page catalog. Other industrial temperature control problems solved by machine are listed. Advantages of units are covered. Six models with capacities from two through fifteen tons are detailed.

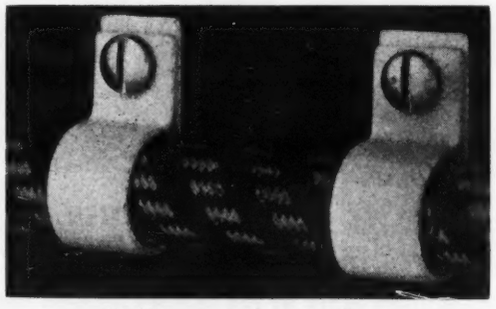
Bul FC-50-C is available from Acme Industries, Inc., Dept. CP, 411 Mechanic St., Jackson, Michigan. When inquiring specify CP 4325 on handy form, pages 2 and 3.

Need for insulation eliminated by plastic cable clamps . . .

flexibility gives them more fatigue resistance

Uses: Cable clamping applications in construction, plant maintenance, power generation, communications, shipping and other industries using cable or heavy wire.

Features: Since material of construction, fiber glass plastic, is a non-conductor, clamps do not require insulation. They are lighter than metal clamps used for comparable holding jobs, will not support combustion, have a high heat resistance, and are fungus-proof and non-corrosive.



Flexibility permits faster installation

Description: Cable clamps are fabricated of glass cloth and polyester resins. Their flexibility gives them greater fatigue resistance even when subjected to continuous vibration. Flexibility also permits faster installation, and causes less wear on cable insulation than do unprotected metal clamps.

Clamps are available in 22 sizes ranging from a .125" diameter loop to a loop of 2" diameter.

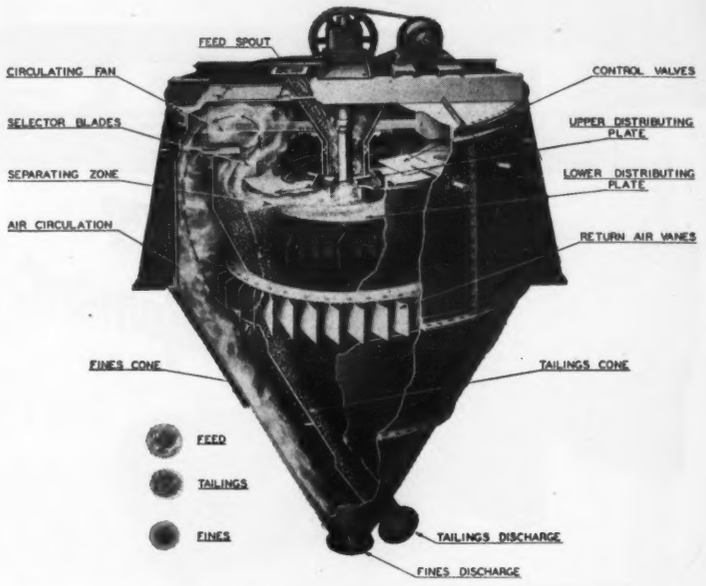
(Cable clamps are a product of Le Conte Plastics Co., Inc., Dept. CP, Farmingdale, L. I., N. Y. . . . or for more information reader may simply check CP 4326 on convenient Reader Service slip which is located between pages two and three.)

Increase Your Output up to 300%...

Get Accurate Fines with...

STURTEVANT

Whirlwind Centrifugal SEPARATORS



The Sturtevant Air Separator is one investment that pays off daily profits by increasing production and reducing costs. Its extremely efficient operation assures finer separation of fine material from coarse material with the result that uniform quality of product is always obtained.

They'll not only increase your output by as much as 300%, but provide 10 to 50% savings in power costs, too. They are available in sizes 3 to 16 feet in diameter with capacities from ¼ to 50 tons per hour with a fine-product range of 40 to 325 mesh or finer. Bulletin 087 gives the entire story. Write for your copy.

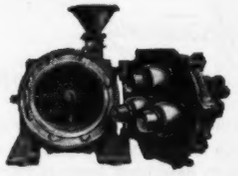
Other Sturtevant Equipment for Increasing Production and Cutting Costs

MICRONIZER® GRINDING MACHINE

A fluid jet grinding machine, the Sturtevant Micronizer speeds reduction of materials to low micron sizes. These jet mills are especially applicable in fields where a particle size in microns is desired.
Sturtevant Micronizer grinding machines are available in many sizes and capacities.

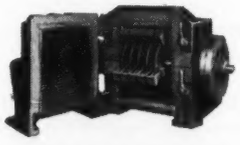
ROTARY FINE CRUSHERS

for intermediate and fine reduction (1" to ¼"). Open door accessibility. Soft or moderately hard materials. Efficient granulators. Excellent preliminary Crushers preceding Pulverizers.



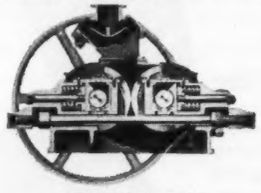
RING-ROLL MILLS

for medium and fine reduction (10 to 200 mesh), hard or soft materials. Very durable, small power. Operate in closed circuit with Screen or Air Separator. Open door accessibility. Many sizes. No scrapers, plows, pushers, or shields.



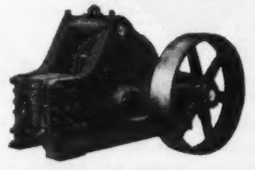
SWING-SLEDGE MILLS

for coarse and medium reduction (1" to 20 mesh). Open door accessibility. Soft, moderately hard, tough or fibrous substances. Built in several types and many sizes.



CRUSHING ROLLS

for granulation, coarse or fine, hard or soft materials. Automatic adjustments. Crushing shocks balanced. For dry or wet reduction. Sizes 8x5 to 38x20. The standard for abrasives.



JAW CRUSHERS

for coarse, intermediate and fine reduction of hard or soft substances. Heavy or light duty. Cam and Roller action. Special crushers for Ferro-alloys. Several types, many sizes.

STURTEVANT MILL COMPANY
119 CLAYTON STREET, BOSTON 22, MASSACHUSETTS

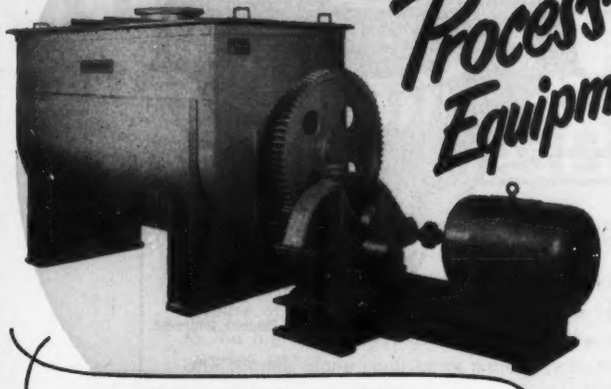
DESIGNERS & MANUFACTURERS OF CRUSHERS • GRINDERS • SEPARATORS • CONVEYORS • MECHANICAL DENS AND EXCAVATORS • ELEVATORS • MIXERS

When inquiring check CP 4327 on handy form, pgs. 2-3

PROCESSING GOES UP
PRODUCTION COSTS GO DOWN with...

Devine

Process Equipment

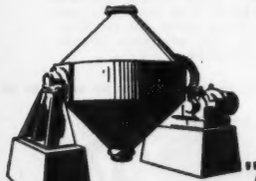


Double-Ribbon Mixers

featuring
"mix and counter-mix" action

Unsurpassed for efficiency and economy in a wide range of heavy duty mixing operations. Removable ribbon assembly permits fast cleaning. Sturdy, all welded construction provides long life and trouble-free service.

Agitators
Blenders
Mixers
Ball and Pebble Mills
Kettles
Fumigators



Double-Cone Blenders

featuring
"roll-and-fold" action

Recognized throughout the food and chemical processing industries for superior performance in blending powders, crystals, etc. Positive control of charging and discharging . . . rapid cleaning . . . minimum contamination.

Write for Catalog and Complete Information

Vacuum Vessels
Impregnators
Dryers
Condensers
Vacuum Pumps
Pressure Vessels
Heat Exchangers
Jacketed Fittings

Tanks
Autoclaves
Bubble Towers
Vulcanizers
Digesters
Evaporators
Stills

2

J. P. DEVINE MFG. CO.

When inquiring check CP 4328 on handy form, pgs. 2-3

MAINTENANCE

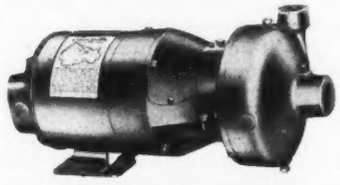
Increases water pressure automatically . . .

booster is centrifugal pump

Uses: To increase pressure in lines from water mains, should that pressure drop because of increased demand.

Features: Booster can be installed directly in lead-in pipe from water main. It is operated automatically by a switch which detects changes in water pressure.

When city water pressure drops below minimum setting, switch starts pump to increase pressure.



Pump is actuated by switch which detects changes in water pressure

Description: Available in many sizes, pressure booster is a centrifugal pump of corrosion-resistant bronze construction. It is compact and utilizes a specially designed sleeve bearing motor for quiet operation.

(Pressure booster pump is a product of Bell & Gossett Co., Dept. CP, 8200 N. Austin Ave., Morton Grove, Ill. . . . or for more information check CP 4329 on handy form, pages 2 and 3.)

Explains characteristics of 85% magnesia

Illustrated 12-page brochure tells how 85% magnesia is produced, why it has high insulating value. Physical characteristics of material are explained in detail. Data tables supplement text.

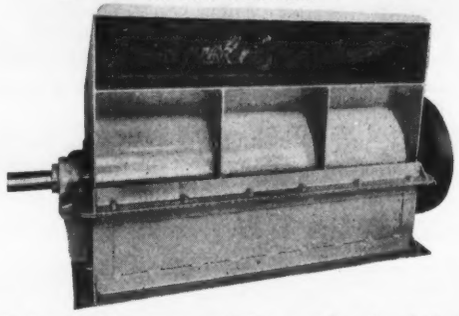
Brochure on 85% magnesia is issued by Johns-Manville, Dept. CP, 22 E. 42nd St., New York 16, N.Y. When inquiring specify CP 4330 on handy form, pages 2 and 3.

MANUFACTURERS OF PROCESSING MACHINERY SINCE 1885

For Preliminary Reduction of Sheet and Film Stock

GRUENDLER MODEL 3-48
STAINLESS STEEL SHREDDER-GRINDER

48 inch wide Feed



Also for handling paper, pulp-lap, wall board and plastic film sheets.
Other Gruendler Grinders and Shredders available up to 72 *inches wide*, with or without FEEDERS.

WRITE FOR INFORMATION and BULLETINS
ABOUT PULVERIZERS — MIXERS — BLENDERS

GRUENDLER
CRUSHER & PULVERIZER CO.
2915 North Market St. *Dept. CP12* St. Louis 6, Mo.

When inquiring check CP 4331 on handy form, pgs. 2-3

Makes Short Work of the Tough Cleaning Jobs

The powerful Oster "Sewer Master" quickly removes obstructions 100 feet or more from the sewer entrance; yet it weighs less than 100 pounds and is easily wheeled to the job, even up or down stairs.

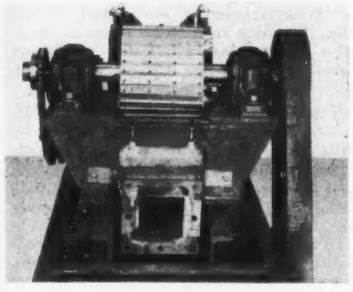
The chuck jaws securely hold and revolve the "snake" in either direction at any distance from the sewer entrance. A large selection of cutting tools are available for most efficient removal of various types of obstructions. For all the facts on the time and money saving "Sewer Master", contact your Oster Distributor, or write us direct.

THE OSTER MANUFACTURING CO.
Main Office and Factory:
2032 East 61st St. • Cleveland 3, Ohio

Builders of Cost Reducing Threading Equipment Since 1893

When inquiring check CP 4332 on handy form, pgs. 2-3

DICES 5,760,000 PELLETS *Per Minute*



This new dicing cutter cuts plastics extruded in rod form into evenly sized pellets without fines or longs.

•

The cuts are clean and free from feathers. The machines are made in two sizes, 6″ and 10″ in diameter.

•

It has 30 fly knives and may be operated at speeds that will produce 5,760,000 pellets per minute.

•

Write for complete details of this new plastic pelleter.

TAYLOR-STILES and Company
CUTTING MACHINES & KNIVES

20 Bridge St. Riegelsville, N.J.

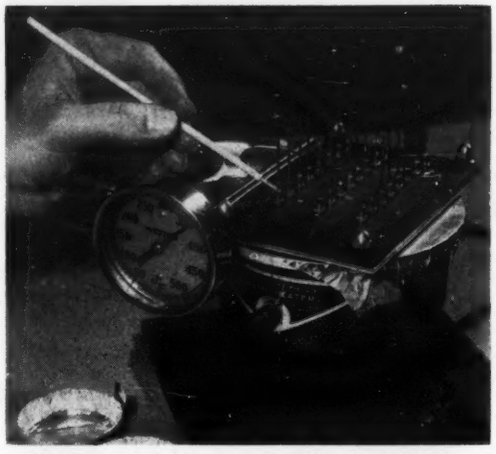
When inquiring check CP 4333 on handy form, pgs. 2-3

No open flame or arc required when welding metal to glass, porcelain, other metal . . .

Uses: Welding metal to glass, metal to porcelain, as well as metal to metal.

Features: Technique of welding does not require open flame or arc. Organic welding material comes in rod form and can be applied with moderate heat and little or no pressure.

Description: Organic welding material, called Tygoweld, has been subjected to tensile strength tests where over 4000 psi has been applied to standard lap shear specimens with only ½″ overlap. Other tests show material to be resistant to oil fats, acids and all normally corrosive materials.



Welding material being used to bond metal hypodermic needle to glass syringe barrels

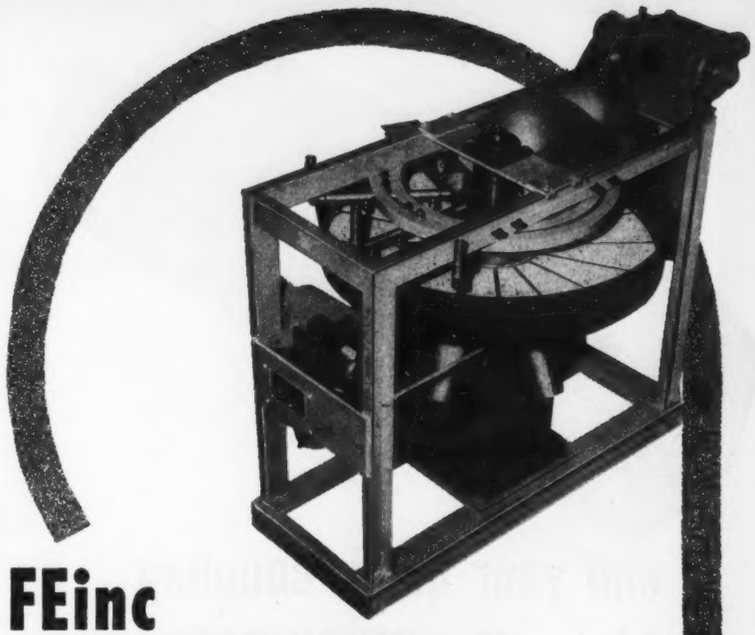
Curing times may be varied by amount of heat that is applied. Often, welded material need be heated only slightly, yet a quick cure will result. It is not necessary to use a welding torch, and it is even possible to apply the weld at room temperature, if more time is allowed.

(Organic welding material is a product of U. S. Stoneware Co., Dept. CP, 5300 Tallmadge Ave., Akron 9, Ohio . . . check CP 4334, pages 2 and 3.)

Instructions for jacketing lines, towers, tanks

Complete application instructions for weatherproofing insulated lines, towers, and tanks with aluminum jacketing are included in illustrated four-page folder.

Folder J-25 is issued by Childers Mfg. Co., Dept. CP, PO Box 7447, Houston 8, Tex. When inquiring specify CP 4335 on handy form, pages 2 & 3.



FEinc

HORIZONTAL ROTARY FILTERS

Best for Free-Filtering Materials

For continuous separation of free-filtering materials such as coarse crystalline or fibrous pulps, the new FEinc Horizontal Rotary Vacuum Filter is the simplest and fastest type available. It offers six advantages:

(1) Hourly output is extremely high; (2) Multiple-stage or counter-current washing provides maximum recovery of solubles with minimum dilution; (3) Results are always visible, easy to control; (4) Cakes can be built up to 4″ or more; (5) Central-mounted drive simplifies installation and maintenance; (6) It is available with totally enclosed rubber-covered or other special constructions.

The FEinc Horizontal is only one of many continuous filters now made by Filtration Engineers. Our Engineering service is the finest available, backed by 35 years of experience, and by the ability to deliver filters that are *tailor-made* to fit the job . . . at no more than standard costs. Whatever the filtration problem, talk to FEinc first.

Ask for Bulletin

Filtration Engineers, Inc.

CUSTOM DESIGNERS AND MANUFACTURERS OF ALL TYPES OF CONTINUOUS FILTRATION EQUIPMENT

FEinc

41 155 ORATON STREET • NEWARK 4, N. J.

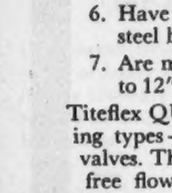
When inquiring check CP 4336 on handy form, pgs. 2-3

end your quick coupling problems the QUICK-SEAL way

If you haven't seen the new Titeflex QUICK-SEAL Straight-through and Check-valve Couplings—you have a pleasant surprise coming. These new Couplings . . .

1. Are leakproof. The higher the pressure, the tighter the seal.
2. Couple and uncouple in ONE SECOND—without tools.
3. Prevent hose kinking—through their 360° swivel action.
4. Are slim, easy to handle, not awkward and bulky.
5. Have no projections to snag or bend.
6. Have heat-treated steel bearing surfaces and stainless steel ball bearings and springs for long life.
7. Are made in a variety of alloys and in many sizes up to 12" diameter. Are interchangeable in the same size.

Titeflex QUICK-SEAL Couplings are made in the following types—Straight-through, Single- and Double-Check-valves. The Straight-through type has a smooth bore for free flow without obstructions. ***Write today for Titeflex QUICK-SEAL Coupling Catalog.***



Titeflex, Inc.
Industrial Products Division
509 Hendee Street
Springfield, Mass.

Titeflex
QUICK-SEAL COUPLINGS

I'm interested in the possibilities for your new Quick-Seal Hose Coupling. Send me complete catalog—no obligation of course.

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Title_____
Firm_____
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City_____ **Zone**_____ **State**_____

SEE US IN BOOTH #750 AT THE PLANT MAINTENANCE SHOW IN CHICAGO.

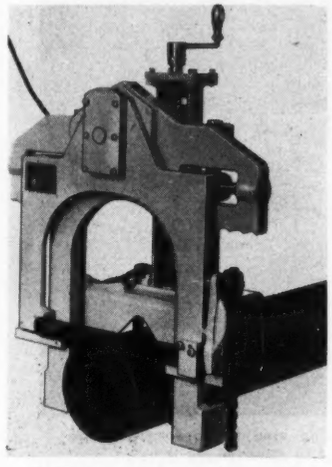
When inquiring check CP 4337 on handy form, pgs. 2-3

Pipe cutting speeded by portable saw

Uses: On-the-job cutting of 2 to 8" cast iron and steel pipe as well as bar stock and beams.

Features: Pipe saw weighs only 120 lb. It will operate in a space 25" wide. Unit is available with electric or air motor.

Description: Chain pipe vise clamps unit, called Guillotine Saw, to pipe and is ready for cutting in a matter of seconds. Machined cast steel V saddle base assures square cut at right angle to pipe. Pipe acts as machine tool base.



Guillotine action cuts pipe quickly

Pipe is cut quickly: 6" standard wall steel pipe in 8 min; 6" standard wall cast iron pipe in 4 min.

(Portable pipe saw is a product of The E. H. Wachs Company, Dept. CP, 1525 N. Dayton St., Chicago 22, Ill. . . . or for more information check CP 4338, pages 2 and 3.)

Construction features of shaft packings

Construction features of lattice braid rod and shaft packings are described in 8-page bulletin.

Bul A-131 is issued by The Garlock Packing Company, Dept. CP, Maple Ave., Palmyra, N. Y. When inquiring specify CP 4339, pages 2 and 3.

Bends Without Distortion of the Tubes

They have the added advantage of easy identification of each tube at both ends during installation, because one tube in each layer is colored a bright blue. The relative position of all tubes can thus be traced by the installer.

These tubes, of copper, aluminum or polyethylene, are thoroughly protected from injury during and after installation by a flexible, interlocked galvanized steel armor.

Substantial savings can be made on moderate to long runs, up to 1,000 feet, eliminating waste and short ends. Tubes are available in 1/4", 5/16", 3/8" and 1/2" O.D. This product is licensed under U.S. Patent 2,578,280.

Send for New 8 Page Bulletin Giving Complete Information and Engineering Data

CRESCENT
INSULATED WIRE & CABLE CO.
TAYLOR ST. TRENTON, N. J.

When inquiring check CP 4340 on handy form, pgs. 2-3

Scientifically designed heat exchangers for which performance can be accurately anticipated . . . for use in the heating or cooling of liquids, slurries, soaps, waxes, acids, alkalis, electrolytes, powders, and mixtures.

Available in special shapes such as "U"s, "L"s, and cylinders . . . and in a wide range of materials, including iron, stainless steel, monel and other special alloys.

Send for FREE bulletin giving facts and prices.

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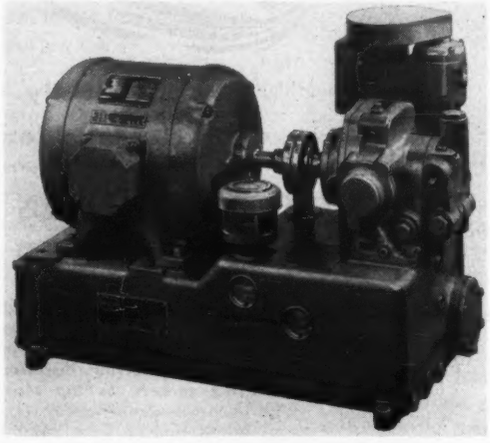
DEAN PRODUCTS, INC. • 616 Franklin Ave., Brooklyn 38, N. Y.
STerling 9-5400
Manufacturers Representatives Wanted • Choice territories now open • Write for details

When inquiring check CP 4341 on handy form, pgs. 2-3

Precise speed or pressure control in one to three horsepower range offered by packaged pumps

Uses: Variable-speed straight-line and rotary drive applications requiring 1 to 3 hp under precise speed or pressure control.

Features: Each pump is a complete package unit including one of eight standard controls, a three-way suction and return valve for differential systems, dual-disc check valves for non-differential systems, and a double acting high-pressure relief valve and a gear pump relief valve.



Two-way variable-delivery pump with 3-hp motor

Description: Variable-delivery pumps, designated Type "A", can be mounted on reservoirs integral with machines or furnished with standard oil reservoirs for mounting both pump and electric drive motor.

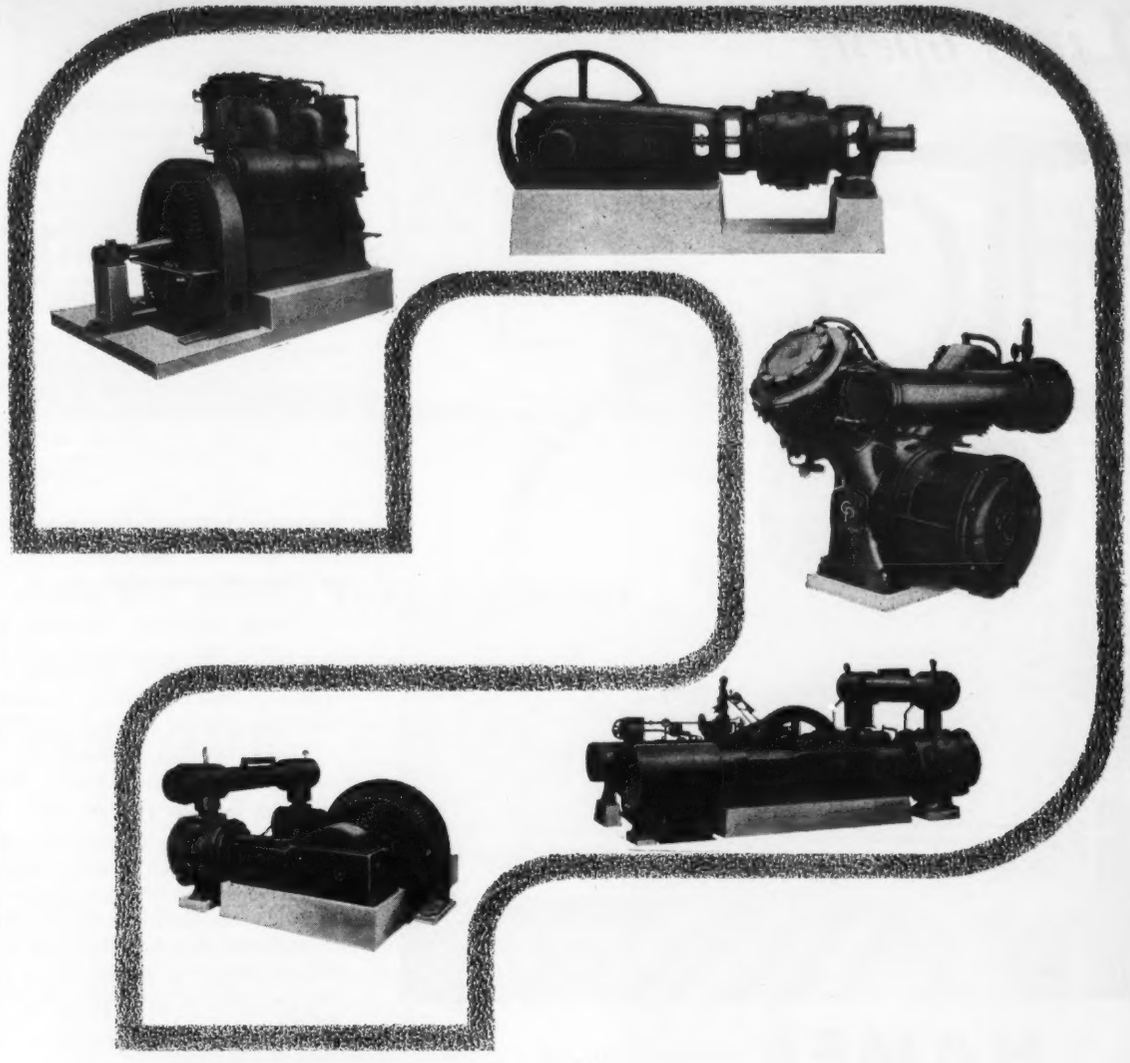
Compact hand-screw, hydraulic servo-motor lever, automatic adjustable pressure unloading, hydraulic remote, electric remote, electric-hydraulic servo and pneumatic controls mount on either side of pump case.

(Variable-delivery pumps are a product of The Oilgear Co., Dept. CP, 1588A W. Pierce St., Milwaukee 4, Wisconsin. Check CP 4342, pages 2 & 3.)

Detailed data on aluminum

Featuring information not found in previous issues, as well as a die-cut thumb-indexing system, book offers 220 pages of detailed data on properties and characteristics of aluminum.

"The Aluminum Data Book", 1954 edition, is available on letterhead request direct to Reynolds Metals Company, Dept. CP, 2500 South Third Street, Louisville 1, Ky.



WHAT DO YOU WANT **IN A COMPRESSOR?**

Whatever your requirements, there's a CP Compressor to fulfill your air needs at minimum operating and maintenance costs. Whether the type is portable or stationary . . . single-stage or multi-stage . . . lubricated or oil-less cylinder . . . vertical or horizontal . . . air-cooled or water-cooled . . . for air or gas compression, you can select from Chicago Pneumatic's wide line of compressors. Capacities range from 60 to 10,000 cfm., 7½ to 2000 hp. For complete information on the type compressor you have in mind, write *Chicago Pneumatic Tool Company, 8 East 44th Street, New York 17, N. Y.*

Chicago Pneumatic

PNEUMATIC TOOLS • AIR COMPRESSORS • ELECTRIC TOOLS • DIESEL ENGINES • ROCK DRILLS • HYDRAULIC TOOLS • VACUUM PUMPS • AVIATION ACCESSORIES

When inquiring check CP 4343 on handy form, pgs 2-3

Lines open?

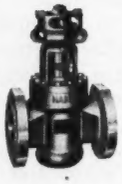
—shut?

HAMER *Visible Shut-off*

LINE BLIND VALVES

HAMER *Plug Valves*

Standard dimensions . . . easy to substitute in existing installations. There's a HAMER *non-stick* Plug Valve for any requirement.



Don't guess—With the Hamer Line Blind Valves you know instantly at a glance which lines are open and which are shut. If the open end of the spectacle plate is up, the line has a **permanent, positive shut-off** . . . blank end up indicates a round, full open line. And Hamer Line Blind Spectacle Plates are easily visible from a distance . . . no need for individual valve checking. An enclosed plate slot on the Hamer Valve eliminates product waste while spectacle plate is being reversed—stops mess, reduces fire hazard.

Send for free catalog.

HAMER VALVES, INC.

2919 Gardenia Avenue
Long Beach 6, California
Representatives throughout to United States

When inquiring check CP 4344 on handy form, pgs. 2-3

Handy reference material on petroleum industry

Up-to-date statistics and other data on the petroleum industry are among the materials found in handy, 32-page reference booklet. Broad sections of booklet include origin, exploration, drilling, production, transportation, refining, supply and demand, marketing, uses and general economics.

Single copies of "Facts About Oil" may be obtained on letterhead request to American Petroleum Institute, Dept. CP, 50 West 50th St., New York 20, N. Y.

Provides 360° reinforcement desirable for "hot taps" of high-pressure pipe . . .

design of saddle eliminates welds in critical crotch area

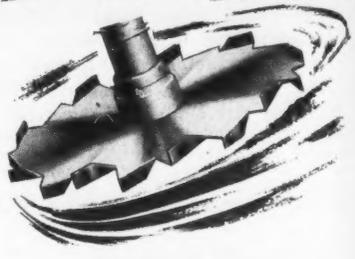
Uses: "Hot tapping" of petroleum piping, when branch connections are to be installed.

Features: Product provides the 360° reinforcement so desirable when dealing with high pressures and large diameter pipe and taps.

Saddle is split longitudinally, on a horizontal plane, perpendicular to axis of outlet, eliminating welds in critical crotch area. When clamped to pipe, two halves of saddle are joined firmly by longitudinal straps. If straps are shop-welded to bottom half of saddle, only one field weld on each side is necessary in addition to weld between outlet of saddle and branch outlet.

Full encirclement saddle, with longitudinal strap welded to bottom half

Description: Full encirclement saddle is designed for use with either high yield strength thin wall pipe, Grade B 35,000 or 42,000 yield strength pipe. It is also for use with heavy walled cylinders employed for suction and discharge headers, bottles, and pulsation dampers in compressor stations.



. . . at practically every installation

THE Cowles DISSOLVER

That is a fact! Over 90% of the users of the Cowles Dissolver classify its performance data, with respect to their dissolving, dispensing or mixing process, as top secret. With hundreds now in use, covering applications ranging from paint to Penicillin, the Cowles Dissolver is doing a sensational job—*in enforced secrecy!*

This much we can tell . . .

- **Operating at rim velocities up to 7500 f.p.m. it dissolves and disperses 2 to 20 times faster, in the same working space.**
- **Its greater efficiency *actually increases yield per batch* in most reactions.**
- **Its capacity for complete dispersion enables many manufacturers to use less expensive raw materials.**
- **Use of the Cowles Dissolver often results in a better end product than originally formulated.**
- **Easy to load and operate, requiring practically no maintenance, it will return your original investment many times.**
- **Cowles *will run lab tests on your material*, in strictest confidence, with absolutely no obligation to you.**

For complete information on the Cowles Dissolver, write for our **FREE CATALOG**

The Cowles Company
INCORPORATED
1211 Trackside, Cayuga, N. Y.

When inquiring check CP 4345 on handy form, pgs. 2-3

It is available in standard and special sizes through 42" and in all straight and standard reducing outlet sizes. Saddle is made from rolled plate of proper chemical composition, mechanical properties, and wall thicknesses required for service conditions encountered. Saddle outlet is forged, and its ID corresponds to the OD of the branch outlet.

(Full encirclement saddle, or hot tap tee, is a product of Tube Turns, a division of National Cylinder Gas Co., Dept. CP, 224 East Broadway, Louisville 1, Kentucky . . . or check CP 4346, pages 2 and 3.)

Foam-in-place material develops low exotherm during cure

Uses: Void-filling for lightweight structural reinforcement, core material for double walled fiberglass laminate radomes, and embedment of electronic components and circuits.

Features: Volumes of several cubic feet of plastic material, with excellent and reproducible structure, can be made in one pouring due to fact that a very low exotherm is developed during cure of material.

Description: Foam-in-place plastic material, called Eccofoam FP, is supplied as a liquid which, upon addition of a catalyst, expands and finally cures to a

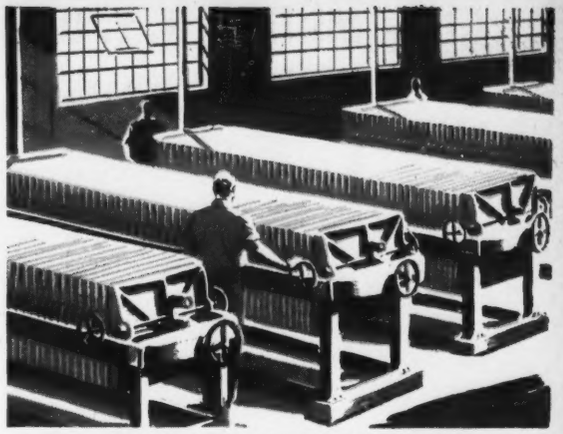
Material can be foamed to any bulk density from 2 through 26 lb/cu ft

rigid thermosetting unicellular foam. Bulk density of material is selected before curing.

Material can be foamed to any bulk density from 2 to 26 lb/cu ft. Properties vary roughly as a function of bulk density. For 10 lb/cu ft material the following applies: compressive strength 340 psi; modulus of elasticity 11,000 psi; dielectric constant 1.18; and dissipation factor 0.0004.

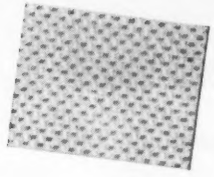
(Foam-in-place plastic material is a product of Emerson and Cuming, Inc., Dept. CP, 869 Washington St., Canton, Mass. Check CP 4347, pages 2 and 3.)

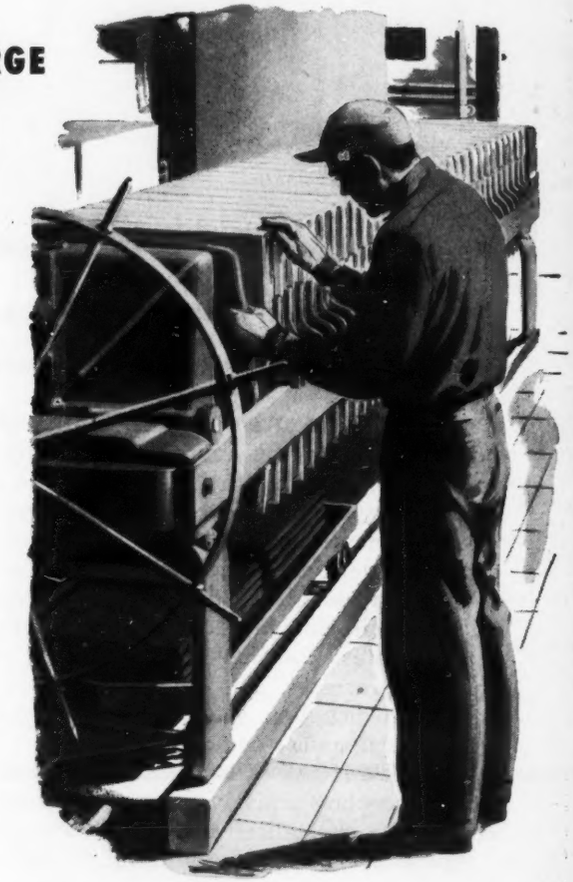
Cotton filter fabrics—widely used in beet sugar processing—are economical, durable, have high wet strength and good mechanical efficiency.



Acrylic type fibers when made up into filter fabrics are highly resistant to strong mineral acids under elevated temperature conditions such as used in certain dye filtration processes.

YOU GET EASIER CAKE DISCHARGE WITH THIS WELLINGTON SEARS FILTER FABRIC





Shown here in use is a press equipped with Wellington Sears filter fabric in a special construction of filament nylon, designed expressly for clay filtration. It is made to stand up under abrasion and flexing . . . and smooth enough for easy cake discharge.

Whatever your "tough problem" there's most likely a Wellington Sears fabric already in use—or one that we can develop—to solve it. There's the confidence in over a century of industrial fabric experience to back up that statement.

Wellington Sears cotton and synthetic filter fabrics are made available to the processing industries through leading filter cloth specialists. Write us for names of those serving your area.

Wellington Sears

A SUBSIDIARY OF WEST POINT MANUFACTURING COMPANY

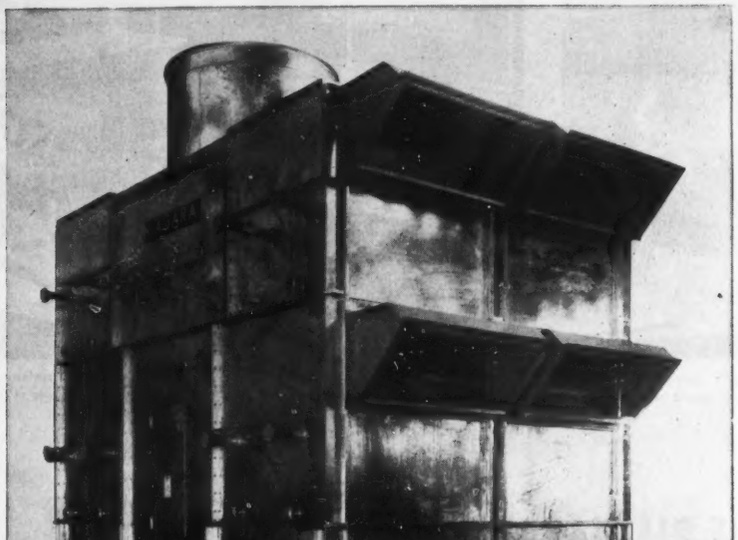
FIRST In Fabrics For Industry

WELLINGTON SEARS COMPANY, 65 WORTH STREET, NEW YORK 13, N. Y.

OFFICES IN: ATLANTA • BOSTON • CHICAGO • DETROIT • LOS ANGELES • NEW ORLEANS • PHILADELPHIA • SAN FRANCISCO • ST. LOUIS

When inquiring check CP 4348 on handy form, pgs. 2-3

Thirty Million B. T. U. CAPACITY



NIAGARA Aero HEAT EXCHANGER

Cooling in Chemical Processes with Precise Control of Temperature

The NIAGARA Aero HEAT EXCHANGER cools liquids and gases by evaporative cooling with atmospheric air, removing the heat at the rate of input, controlling temperature precisely. You save 95% of cost of cooling water; you make great savings in pumping, piping, power; quickly recover your installation cost.

You can cool and hold accurately the temperature of all fluids, air and gases, water, oils, solutions, chemical intermediates, coolants for mechanical, electrical and thermal processes. You obtain closed system cooling free from dirt. You solve all the problems of water availability, quality or temperature.

In CHEMICAL PROCESSES this is successfully used in cooling liquids and gases, chemical reactions, condensing distillations and reflux cooling.

Write for complete information; ask for Bulletins 120 and 124. Address Dept. CP

NIAGARA BLOWER COMPANY

405 Lexington Ave. New York 17, N. Y.

District Engineers in Principal Cities of United States and Canada

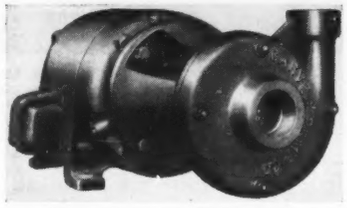
When inquiring check CP 4349 on handy form, pgs. 2-3

MAINTENANCE

Where space is scarce close-coupled pump proves versatile

Uses: General service applications in industrial plants.

Features: Being close-coupled, compact centrifugal pump is particularly useful where space is at a premium.



Pump is available in 2, 3, and 5-hp sizes

Description: Close-coupled centrifugal pumps, designated Model BB Electropumps, have 1½" discharge. They are available in 2, 3, and 5-hp sizes, with capacities up to 150 gpm and heads up to 140 feet.

(Pump is a product of Carver Pump Co., Dept. CP, 1056 Hershey Ave., Muscatine, Iowa . . . or check CP 4350, pages 2 and 3.)

Portable steam cleaner does job quickly on-the-spot . . .

not necessary to dismantle equipment being cleaned

Uses: Cleaning motors, compressors, condensers, other machinery and small parts without necessity of dismantling.

Features: Actual weight of cleaning unit is approximately 16 lb, ready for operation. Cleaner has a capacity of ½ gal of water and can be brought up to operating temperature and pressure in 20 min using cold water. With hot water, waiting period is considerably shortened.

Steam jet feed is operated by fingertip control. Changeover from wet to dry steam is instantaneous and is accomplished by tilting unit

A Perfect fit

THIS ROTARY DRUM PRESSURE FILTER IS TYPICAL

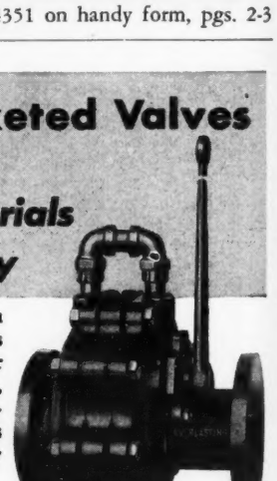
of the special designs G-B engineers develop to handle particular needs. The filter drum is 6'-0" in diameter by 8'-0" in length, and in this instance maintains a positive pressure of carbon dioxide on the filter cake to prevent the chemical reaction from reversing. Every detail has been worked out to fit the filter to the exact needs, rather than utilizing a "standard" filter and making the process conform to the filter.

G-B Engineers will work with you, too... without obligation!

GOSLIN-BIRMINGHAM MANUFACTURING CO., INC.
BIRMINGHAM - ALABAMA

When inquiring check CP 4351 on handy form, pgs. 2-3

Steam Jacketed Valves *that keep Viscous Materials flowing freely*



These valves protect you from clogging troubles when handling coal tar products, asphalts, resins, waxes, molten sulfur, varnish and other materials which congeal at ordinary temperatures.

Their exclusive design includes jacket space around ports as well as body, straight-through flow, quick-acting lever, non-wedging mechanism, self-grinding discs, and lasting tightness.

Sizes: 1½ in. to 6 in. Iron Body: 125 psi line pressure. 250 psi jacket pressure. Cast Steel Body: 150 psi line pressure. 300 psi jacket pressure.

EV 385A

EVERLASTING VALVE CO., 73 Fisk Street, Jersey City 5, N. J.
Trade Mark "EVERLASTING" Reg. U. S. Pat. Off.

Everlasting Valves

for everlasting protection

When inquiring check CP 4352 on handy form, pgs. 2-3

When ready for operation, steam cleaner weighs about 16 lb

from horizontal to vertical position. Unit degreases as it cleans.

Description: Cleaner is called "Steam Kleen" Jet Sprayer Model No. 111. It is electrically heated, thermostatically controlled, and operates on any 110 and 115v circuit. It is fitted with a steam safety valve. Construction complies with ASME Miniature Boiler Code.

(Portable cleaning unit is a product of Henry Flow Control Company, Dept. CP, 3215 North Ave., Melrose Park, Ill. . . . for more information check CP 4353 on handy form, pages 2 and 3.)

Expandable polystyrene pictured in bulletin

Application of company's foamable polystyrene in various industrial fields including thermal insulation, sandwich constructions, electronics, and packaging, are discussed in illustrated bulletin. Also included is technical information with charts and diagrams in color.

Bul C-4-204 is available from Chemical Division, Koppers Company, Inc., Koppers Building, Pittsburgh 19, Pa. When inquiring specify CP 4354 on handy form, pages 2 and 3.

For more information on product at right, specify CP 4355 . . . see information request blank between pages 2 and 3.

Here's another new lubrication improvement from Standard Oil

WHITE

NEW STANOLITH GREASE

A new grease! White and clean in appearance, STANOLITH Grease White is the perfect grease for use in food and beverage plants.

Specially recommended for bakeries, breweries, candy factories, canning and cereal plants, chemical processing plants, dairies, distilleries, meat processors — all industries where clean, sanitary operating conditions are at a premium.

● STANOLITH Grease White is a new high quality, multi-purpose lithium soap grease with a clean, white color. It assures you of unmatched lubricating cleanliness *plus* unmatched lubricating efficiency.

In addition to the high-temperature and water resistant properties, characteristic of most lithium greases, STANOLITH Grease White has superior mechanical and chemical stability. It provides a water-resistant lubricating film that gives this remarkable grease extended multi-purpose usage in a wide variety of applications. Easily handled in all usual types of grease-dispensing equipment, it is safe, easy-to-use, clean. Call your nearby Standard Oil lubrication specialist for full details on new STANOLITH Grease White.

STANDARD OIL COMPANY *(Indiana)*

STANDARD

plant-location news

How to get facts on raw materials

Just what do you need to know about raw materials before you pick a new plant site? Where to get aluminum castings in a hurry? How much it will cost to deliver 200 tons of Connellsville coal daily to your doorstep? Are synthetic yarn suppliers near at hand? Where can you find large and available quantities of high calcium limestone? Can you expect a continuing local supply of veneer logs? Storage and terminal facilities for handling bulk items? A chemical analysis? A cost schedule?

Whatever you need to know about a material—whether it's of local origin or comes from New Zealand, whether it's still in the earth or in a semi-processed state—New York State's Industrial Location Service will give you the answers fast. And there's no cost or obligation.

I don't think there's any industry we can't serve. No matter what your special problems, we'll tell you where to locate needed materials and supplies. Because most of our clients are sticklers for perfection, we are, too. We'll describe the quality and quantity of raw materials, and give the total cost for delivery to any destination you say.

The full story in two weeks

Recently a manufacturer of glass bodies for electronic tubes wrote us for information on the materials vital to his operation—glass sand and natural gas. Our ILS staff set to work as they always do. They studied geological maps, analyzed samples, tabulated supply data, sent out information requests to district ILS offices, and consulted experts in the field. Within two weeks the manufacturer had a complete, concise report on his desk covering several desirable industrial locations.

Quick and easy to read

He didn't have to wade through complicated charts, graphs, and heavy-going paragraphs. The report was current, concise, and it was complete.

He didn't have to follow up footnoted references, or check so-and-so's special report on the sands of Upper Hollow. With the data furnished in our report, he could pick the best possible plant location with unerring accuracy.

Other free plant-site services

Raw materials won't be your only concern when you're looking for a new plant location. But no matter what factors are involved, ILS can be of help. Free reports are available on transportation, markets, water, labor, buildings and sites, and local laws and regulations—to mention just a few.

Our booklet called "Industrial Location Services" shows how you can put this valuable plant-location data to work. To get your copy, just write me at the New York State Department of Commerce, Room 861, 112 State Street, Albany 7, N. Y.

Ronald B. Peterson

Director Industrial Location Service

When inquiring check CP 4356 on handy form, pgs. 2-3

Recent Books

The Properties of Glass

Reviewed by H. H. HOLSCHER
Owens-Illinois Glass Company

Ever since G. W. Morey's "The Properties of Glass" was published in 1938, it has been one of the authoritative references for the man interested in glass as a material. For process and product information he has had to look elsewhere. The second edition, issued in April 1954, carries the same format and will serve in the same capacity as the first.

For one who is seeking a one-volume source of information on the properties of glass, the book can be highly recommended. Density and optical properties are tabulated in full, but for the effects of viscosity and thermal attributes on the processing of glass, some other reference must be sought. Compositions are adequately covered, but one cannot get the total feel of recent trends in composition in the tonnage glass industries.

Although this 591-page book gives recent references for all important properties, such references are sandwiched into the old format and usually suffer from very limited discussion. The figures are largely the same as those in the first edition, but even the new ones do not completely present the development story over the past fifteen years. The section on constitution does not give a picture of the present widespread activity in this field. The reader still infers that the X-ray work of Warren is the last word on the structure of glass.

In general, one gets the impression that developments of the past fifteen years are not outstanding when compared with those of earlier years.

To obtain "The Properties of Glass," remit $16.50 *direct to Reinhold Publishing Co., Dept. CP, 430 Park Ave., New York 22, New York.*

Successful Commercial Chemical Development

(*Staff Review*)

This 374-page book has no author — in the usual sense. In its attempt to remove commercial chemical development from the realm of intuition and develop a methodology, it has made use of services of dozens of recognized experts in this field.

It attempts to document the important principles of every important step, from test tube to tank car, in the birth of new chemical products. These steps include project selection, objectives, management, handling, sampling, trade names, advertising, pricing, marketing, and other interlocking details.

Not the least valuable feature of this book is a set of case histories — of success and failure — of chemical products.

As a first book in this field, "Successful Commercial Chemical Development" deserves wide readership.

To obtain "Successful Commercial Chemical Development," edited by H. M. Corley, remit $7.75 *direct to John Wiley & Sons, Inc., Dept. CP, 440 Fourth Ave., New York 16, N.Y. Specify CP 4357, pages 2 and 3.*

Industrial Stoichiometry

Reviewed by D. S. DAVIS
Professor of Chemical Engineering
Virginia Polytechnic Institute

Even in 1954 some colleges attempt to teach chemical engineering without providing second-year students with adequate groundwork for the techniques to be encountered in unit operations, chemical engineering calculations, and thermodynamics. Industrial stoichiom-

etry is an ideal first course in chemical engineering, and this second edition of one of the leading texts in that field should do much to correct this unfortunate situation.

Lewis, Radasch, and Lewis demonstrate "analysis by calculation" generously in chapters devoted to fuels, material and energy balances, equilibrium, sulfur and nitrogen compounds, lime and cement, fixed alkalis, metallurgy, ceramics, and design problems in which numerous illustrative examples are worked out in gratifying detail. Although some tightening of the lines would improve the presentation, and answers are needed for more than the present 22 of the 171 problems, this 429-page revision is again the outstanding text in the subject and is likely to be for another quarter century.

Good tables, plots, and flow sheets, and adequate index and an excellent appendix match the quality of the text matter. These features add up to a book that reveals unmistakably "the paw of the lion" — W.K. Lewis of M. I. T., the senior co-author.

To obtain "Industrial Stoichiometry" remit $7.50 *direct to the McGraw-Hill Book Co., Inc., Dept. CP,* 330 *West* 42*nd St., New York* 36, *N. Y.*

Artificial Fibres

Reviewed by DR. LANDON A. SARVER
Professor of Chemistry
University of Hawaii

This second edition of R. W. Moncrieff's "Artificial Fibres" represents a substantial revision and enlargement of the original 1950 edition — an increase from 323 to 467 pages. There are seven entirely new chapters dealing with Lanusa, Fibre E, Vinyon N, Dynel, Vinylon, Kuralon, Acrilan and X-51, and with the economic and social aspects of artificial fibres, while the other chapters also contain considerable new material.

Any author of a book on artificial fibres is plagued by the secrecy maintained by most manufacturers, and a certain amount of guessing about the details of processes is inevitable; but Moncrieff has done a meritorious piece of work.

In general, each fibre is discussed as to chemical nature, raw materials, methods of manufacture, physical and chemical properties, dyeing and uses, plus a variety of other subjects applying to the individual fibres. The Nelson and the Industrial Rayon Corporation processes for the continuous spinning of viscose rayon are described in detail, and a brief mention is also made of the Avisco Filamatic High-Speed Continuous Spinning Process, which gives dried finished yarn of uniform characteristics in a matter of seconds after the formation of the filaments.

For anyone desiring comprehensive information on man-made fibres, there probably exists no more convenient or reliable source than this. As a matter of fact, your reviewer has already used the first edition of the book for several years as his principal aid in the preparation of public technical addresses relating to these new and important textile fibers.

To obtain "Artificial Fibres" remit $6.50 *direct to John Wiley and Sons, Inc., Dept. CP,* 440 *Fourth Avenue, New York* 16, *N. Y. Specify CP* 4358, *pages* 2 *and* 3.

Paper Chromatography

Reviewed by JOYCE EVANS HILL
Mobile, Alabama

Paper chromatography has rapidly become an indispensable tool to the microanalyst engaged in the separation of various substances. Although many articles have been published on this method of analysis, the need for a working manual, as well as reference book, has been prominent. The second edition of Dr. Friedrich Cramer's "Paper Chromatography" is an excellent answer to this need.

Primarily designed for laboratory use, the book presents a condensed, but thorough, study of the procedures and techniques involved in effecting chromatographic separations. The text is not confined, however, to descriptive methods, and the section on historical background, theory, and scope are interesting and informative.

The extensive bibliography is impressive but of little aid to the American reader without access to a wealth of foreign publications. Included in the 124 pages of the volume are 68 figures, four-colored plates, two transparent keys, and one folding plate, all of which are valuable additions to this text with handbook qualities.

To obtain "Paper Chromatography" remit $5 *direct to St. Martin's Press, Inc.,* 103 *Park Ave., New York* 17, *N. Y. Specify CP* 4359, *pages* 2 *and* 3.

5 reasons for using DAY "AC" (HERSEY TYPE) DUST FILTERS for efficient dust control

DAY Dust Filters are doing an outstanding job in a wide variety of applications. Here are five reasons why so many chemical processing companies use (and reorder) DAY Dust Filters.

1 Constant resistance resulting in constant air volumes.

2 High pressure reverse jet cleaning of filter tubes gives high air-to-cloth ratio.

3 Self-adjusting blow rings assure perfect tube cleaning, giving maximum air volumes at lowest pressures.

4 No shut-down to clean. Constant, automatic operation.

5 Installation requires minimum space.

DAY service includes surveying your dust problem, engineering a practical solution and manufacturing the required equipment. DAY makes Exhausters, Cyclonic Separators, Filters, Piping, Fittings, Hoods; in fact, everything needed to complete your dust control system. This ONE UNDIVIDED RESPONSIBILITY assures you a more efficient installation.

If you have a dust control problem, whether it involves a complete dust control system or a single unit, your inquiry is invited. WRITE FOR BULLETIN 528-R.

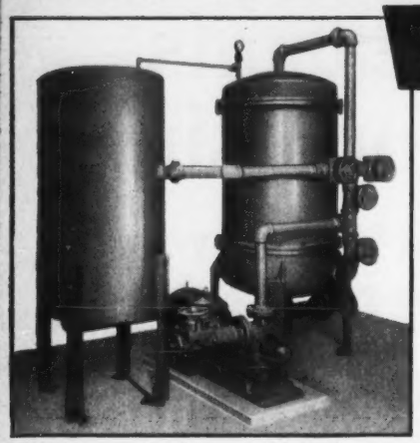
Two of eight DAY "AC" (Hersey Type) Dust Filters used by Chas. Pfizer & Co., Inc., at the Groton, Conn., plant. 99.99+ per cent filtering efficiency consistently provided.

DAY SINCE 1881 DUST CONTROL A SINGLE UNIT OR A COMPLETE SYSTEM

The DAY Company
852 Third Ave. N. E. • Minneapolis 13, Minn.
IN CANADA: P.O. Box 70Y, Ft. William, Ontario
Branch Plants: Buffalo, Ft. Worth and Toronto, Ontario
Representatives in Principal Cities

When inquiring check CP 4360 on handy form, pgs. 2-3

WAGNER BROTHERS FILTERS OFFER CHEMICAL PROCESSORS



DOUBLE ECONOMY

LOW OPERATING COST • LOW MAINTENANCE COST

CONSIDER TWO FACTORS BEFORE YOU SPECIFY FILTERING EQUIPMENT:

1 The gallons of solution which can be efficiently filtered in a given period of time.

2 The cost of maintaining the filtering mechanism.

It's an established fact that Wagner Brothers Filters have a higher effective flow rate than any other equipment with *equal filtration area* . . . thus, gallon for gallon, it delivers *more* pure filtrate *per hour* at a lower unit cost. Sludge and other suspended matter (down to 1/10 micron) are removed when the bath or solution is pumped through permanent membranes caked with a few cents worth of filter-aid (diatomaceous earth).

To clean, you simply turn a few valves and reverse the flow. Air bump backwash shocks the caked filter-aid from the membranes and through the sludge drain. Maintenance costs are reduced to ½ that of ordinary industrial filters since there is no messy replacement of bags, sheets or pads, no manual cleaning labor, no dismantling.

Standard models are available in capacities from 500 GPH up, filter areas from 3 to 100 square feet.

We design and build specials to suit your requirements. Write for detailed information and filtering questionnaire.

Wagner **BROTHERS, INC.**

520 MIDLAND AVENUE • DETROIT 3, MICHIGAN

CHICAGO • ROCHESTER • CLEVELAND • CINCINNATI • INDIANAPOLIS • ST. LOUIS • NEW YORK

When inquiring check CP 4361 on handy form, pgs. 2-3

BLAW-KNOX
TIGHT-LIP BUCKETS . . .

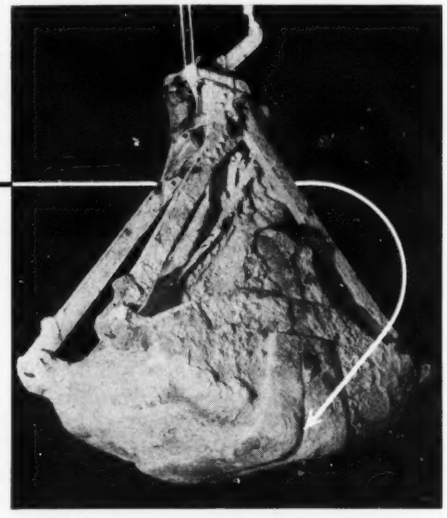
PREVENT CONTAMINATION *in your Material Handling Operations*

BLAW-KNOX Chemical and Fertilizer Buckets are equipped with tight-fitting cast steel lips to prevent costly contamination caused by leakage of granular fines. This is but one of the many features of interest to you.

Blaw-Knox bucket engineers have had many years of worldwide experience in the design and application of buckets for the chemical and fertilizer processing industries.

This expert engineering service is available to you without obligation for the purpose of analyzing your operating problems and requirements and helping you select the proper size, weight and type bucket for peak performance.

In all probability we have already had experience in solving problems that may be puzzling you. Write for this free service.



Blaw-Knox size No. 0701 rated 1¼-cu. yd. heavy-duty lever arm bucket with 24" style "B" equalizer handling acid phosphate.

Write for Bulletin 2378 today.

BLAW-KNOX COMPANY
BLAW-KNOX EQUIPMENT DIVISION
Department 763
PITTSBURGH 38, PA.
Offices in Principal Cities

BLAW-KNOX CLAMSHELL BUCKETS FOR THE CHEMICAL INDUSTRY

When inquiring check CP 4362 on handy form, pgs. 2-3

new literature

Industrial bulletins pertinent to the reader . . . offering data on products, processes, services

Gives data, uses, design features of Rockwell hardness testers

Comprehensive, illustrated 74-page catalog gives engineering data, uses, and design features of complete line of Rockwell hardness testers. Published in four sections, catalog details data on normal, superficial, micro and macro hardness testers.

"Rockwell Testers" is issued by Wilson Mechanical Instrument Div., American Chain & Cable Co., 929 Connecticut Ave., Bridgeport 2, Conn. Specify CP 4363, pages 2 and 3.

Gives properties, uses of aliphatics, alkenyl succinic acid anhydrides

Manufacturer's line of high purity aliphatic derivatives and alkenyl succinic acid anhydrides are detailed in 16-page booklet. Physical properties and uses of saturated and unsaturated hydrocarbons, alcohols, alkyl halides, ethers, and aliphatic sulfur compounds are given in first section of booklet. Second section describes the anhydrides in detail. A two-page bibliography is included.

"H-W Products" is issued by Humphrey-Wilkinson, Inc., Dept. CP, De Vine St., North Haven, Conn. When inquiring specify CP 4364 on handy form, pages 2 and 3.

Unit takes place of cooling tower and shell-and-tube cooler

Advantages, features, and operation of 400-ton-capacity condenser for liquid cooling and condensing applications are explained in two-page bulletin. Unit takes the place of both cooling tower and shell-and-tube cooler. Photographs show how simply and rapidly equipment can be erected. Flow diagram illustrates principle of operation.

Bul 123 is issued by Niagara Blower Company, Dept. CP, 405 Lexington Avenue, New York 17, New York. Specify CP 4365, pages 2 and 3.

Describes, illustrates control systems and pneumatic transmitters

Control systems for temperature, pressure, liquid-level, flow, and specific gravity are illustrated and described in 56-page book. Text explaining control circuits is augmented by schematic diagrams printed in four colors. Complete design specifications are given for indicators, recorders, flow integrators, and relays.

Bul 98097 is issued by Taylor Instrument Co., Dept. CP, 95 Ames St., Rochester, N. Y. Specify CP 4367, pages 2 and 3.

Melting charts help select proper induction heater

High-frequency induction metal-melting and heating equipment is described in four-page bulletin. Photographs illustrate unit for laboratory or small production runs, in which melting table is integral with control cabinet and power supply. Also shown is compact generator-powered furnace for larger melts. Melting charts aid in selecting proper size unit.

Bul 60 is issued by Inductotherm Corporation, Dept. CP, 620 East Glenolden Avenue, Glenolden, Pa. Specify CP 4368, pages 2 and 3.

Illustrates research and production of polyvinyl chloride resins

Research and production of manufacturer's Exon (polyvinyl chloride) resins are illustrated in 16-page booklet. The various Exon resins produced are briefly described.

"Exon" is issued by Chemical Sales Div., Firestone Plastics Co., Div. of Firestone Tire & Rubber Co., Dept. CP, 500 Firestone Bldg., Pottstown, Pa. Specify CP 4369, pages 2 and 3.

Operating principles, test data on heavy-duty chain drives

Expanded data on capacity ratings of company's high-speed, heavy-duty chain drives are included in 16-page catalog. Operating principles and test reports are given on drives that will carry up to 190 hp per inch of chain width at continuous chain speeds to 6000 fpm.

Cat C72-51 is available from Morse Chain Co., Dept. CP, 7601 Central Ave., Detroit 10, Mich. Specify CP 4370, pages 2 and 3.

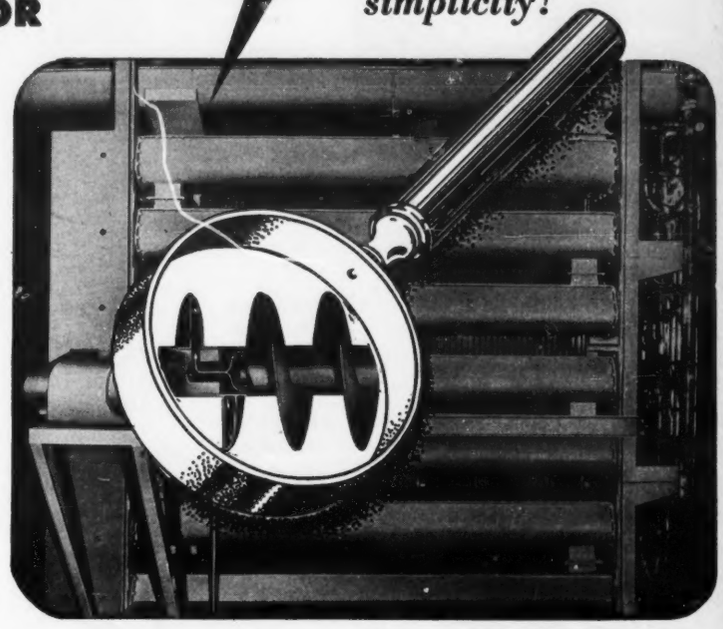
Technical data on the revolutionary new

holo-flite*

(HOLLOW-FLIGHT)

PROCESSOR

—the Continuous-Flow Heat-Exchanger that is setting new standards of *compactness! adaptability! simplicity!*



If you have processing operations where slurries, solids, pulps or pastes must be cooled or cooked, be sure to investigate the many unique advantages of the newly-developed HOLO-FLITE Processor before you install *any* heat-exchange equipment.

Here's the HOLO-FLITE principle . . .

Two or more screw conveyors rotate slowly in a trough. The blades and shaft of each flight of conveyors are hollow, with provision for circulating the heat-transfer agent through them. The product to be cooled or cooked is moved along the trough, being constantly rotated into, around, over and under the conveyor screws as it moves.

Thus, a continuous thermal transfer takes place between the product and the heat-transfer fluid circulating in the blades. The product is cooled or cooked in *continuous-flow* without the "stop-and-go" losses of batching operations . . . and cooled products can be packaged directly from the HOLO-FLITE discharge—saving space, time and additional handling.

THIS 6-TIER HOLO-FLITE cools 7 tons of cottonseed press cake per hour from 285° to 89°F. *in a total floor space of only 28 sq. ft.*
***(Inset)* Enlarged cutaway view of HOLO-FLITE screw showing heat-transfer principle.**

Here are typical HOLO-FLITE advantages

The HOLO-FLITE principle is so unique it is setting completely new standards of performance in *many* ways. For example . . .

*Reg. T.M.

The HOLO-FLITE Saves Space—It requires as little as 1/5th the space of other units of comparable capacity because (1) it has far greater heat-transfer area per cubic foot of space . . . and (2) the flights can be "tiered" as high as desired to give maximum capacity in very small floor areas.

The HOLO-FLITE is Versatile—Processed product can be fluid, pulp or paste—granular, crystalline or powdered solid. Heat-transfer fluid can be refrigerant, cooled or ambient water, steam, oil or any other desired fluid, at any normal temperature range.

The HOLO-FLITE Is Dust-Free—Its gentle action provides large heat-transfer action without dust and with negligible particle abrasion. Simplifies installations, assures higher quality product.

The HOLO-FLITE Is Adaptable—It can easily be designed to handle virtually any capacity by (a) varying the diameter of the screws (7" to 16") . . . (b) varying the length of the screws (8 ft. to 20 ft.) . . . (c) varying the number of intermeshing screws per trough (2, 4, or 6) . . . and (d) varying the number of tiers stacked on top of one another (1 to 10, or more).

WESTERN Precipitation CORPORATION

DESIGNERS AND MANUFACTURERS OF EQUIPMENT FOR COLLECTION OF SUSPENDED MATERIALS FROM GASES & LIQUIDS

Main Offices: 1023 WEST NINTH STREET, LOS ANGELES 15, CALIFORNIA
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1429 PEACHTREE ST. N.E., ATLANTA 5 • HOBART BLDG., SAN FRANCISCO 4
PRECIPITATION CO. OF CANADA, LTD., DOMINION SQ. BLDG., MONTREAL

The HOLO-FLITE is in daily operation on such typical products as sand, cement, cottonseed cake, soybean meal, borax, salt, sugar, baby foods and many other equally-varied products.

What is your problem? ***Our engineers will be glad to assist you in making the most of* HOLO-FLITE *advantages. Write wire, or phone the office nearest you!***

Want More Facts? This 8 page booklet describing the HOLO-FLITE in greater detail will gladly be sent on request. No obligation, of course.

When inquiring check CP 4371 on handy form, pgs. 2-3

THERMAL'S

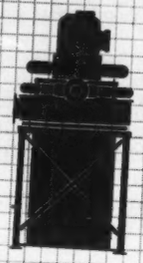
COMPACT FIRED

HEAT EXCHANGERS

CAN SOLVE YOUR

HEAT TRANSFER

PROBLEM . . .



PRESSURE: 300 PSIG

TEMPERATURE: 1200 F

CAPACITIES: 750,000 TO 8,000,000 BTU/HR

TYPE DF for high pressure, high temperature applications.

PRESSURE: 50 PSIG

TEMPERATURE: 1000 F

CAPACITIES: 250,000 TO 1,500,000 BTU/HR

TYPE FT for medium pressure and temperature applications.

Unique THERMAL Burners make these heat exchangers possible—

Whether it be an existing standard design or a unit for your special requirements, THERMAL heat exchangers provide the ultimate in compactness, high performance and response. Always designed around the high velocity combustion characteristics of THERMAL burners, they are supplied as complete "package" installations including all control and accessory equipment.

TO YOUR SPECIFICATIONS

Send us your requirements. Our engineers will make a prompt analysis.

ECONOMICAL, TROUBLE-FREE DESIGN...

Both the type DF and FT THERMAL Heat Exchangers use a coiled tube design feature to allow for expansion. The clear flame characteristic of the THERMAL Burner makes convection the primary heat transfer means and thus promotes uniform metal temperature and long life.

OTHER THERMAL PRODUCTS & SERVICES . . . . . GAS & OIL BURNERS • COMBINATION GAS-OIL BURNERS • HEAT EXCHANGERS • AIR HEATERS • SUBMERGED COMBUSTION • COMBUSTION & HEAT TRANSFER ENGINEERING

THERMAL

Thermal Research & Engineering Corp.

CONSHOHOCKEN • PENNSYLVANIA

REPRESENTATIVES IN PRINCIPAL CITIES

When inquiring check CP 4372 on handy form, pgs. 2-3

NEW LITERATURE

Explains advantages of gas purifiers

Units for catalytically removing oxygen, hydrogen, or carbon monoxide from certain gases (by use of Engelhard catalyst) are pictured and described in six-page bulletin. Purifiers range in size from 5 to 500,000 cfh or larger.

Bulletin points out advantages of different units and discusses operation and applications. Also described is gas generator and process accessories.

"The Deoxo Gas Purifiers" is issued by Baker and Company, Inc., Dept. CP, 113 Astor Street, Newark 5, N. J. When inquiring specify CP 4373 on handy form, pages 2 and 3.

Acetone data

Single page data sheet furnishes description and physical properties of acetone, solvent and intermediate.

Bul S-02-4 is issued by Chemical Div., Celanese Corporation of America, Dept. CP, 180 Madison Ave., New York 16, N.Y. When inquiring specify CP 4374 on handy form, pages 2 and 3.

Describes, illustrates centrifugal throwers

Extensively illustrated eight-page bulletin explains advantages of centrifugal throwers for loading boxcars, bins, and stock piles. Centrifugal action of material against high-speed belt causes bulk material to be thrown as far as 35 feet in direction that unit is aimed.

Bul 854 is issued by Standard Products Div., Stephens-Adamson Mfg. Co., Dept. CP, 11 Ridgeway Ave., Aurora, Ill. When inquiring specify CP 4375 on handy form, pages two and three.

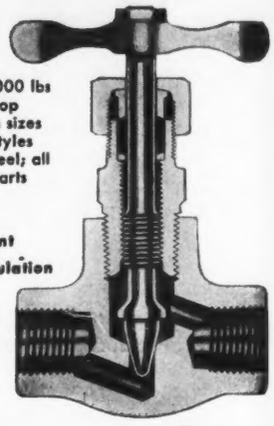
Protect Meters, Instruments

Edward

Gage Valves

Moderately priced, these low cost compact valves find many applications for gage, meter and instrument service. Rated conservatively for 4000 lbs at 150F, 600 lbs at 750F, these drop forged steel valves are furnished in sizes from ⅛" to 1". Globe and Angle styles in three body materials—carbon steel; all parts 13% chromium steel; or all parts 18-8 stainless steel. Construction features include:

- tight tapered body-bonnet joint
- semi-needle stem for fine regulation
- wide seat joint for tight seating
- bonnet and packing nut plated to reduce galling and corrosion



For complete information write for Catalog 104.

Another Product

Edward Valves, Inc.

Subsidiary of ROCKWELL MANUFACTURING COMPANY

1230 West 144th Street, EAST CHICAGO, INDIANA

When inquiring check CP 4376 on handy form, pgs. 2-3

SPERRY

FILTRATION ECONOMY — UNLIMITED

Every feature of each Sperry Filter Press is designed for extra efficiency, greater value. You get maximum clarity. A filter that handles any product, uses the simplest filter media or base, requires less cost, less space, less upkeep. All the advantages which help make Sperry foremost in filtration.

For the complete story, send for Sperry's big, brand-new catalog. An insight into the filtration picture — with charts, specifications, models and money-saving facts. Write for your copy today. It's free!

D. R. SPERRY & CO., BATAVIA, ILL.

Filtration Engineers for Over 50 Years

Eastern Sales Reps: George S. Tarbox, 808 Nepperhan Ave., Yonkers 3, N. Y., Yonkers 5-8400

SPERRY FILTER PRESSES

Western Sales Reps: S. M. Pilhashy, 833 Merch. Exch. Bldg., San Francisco 4, Calif., DO 2-0875

When inquiring check CP 4377 on handy form, pgs. 2-3

Are you ready for automation? — chart provides answer

"Ready for Automation?" Answer to this question is offered in what is described as the first automation evaluation chart. Brochure containing chart first gives some pertinent facts and a definition of automation. It cites a flour mill built in 1783 as the first "automatic" factory and calls attention to automation techniques now being used in automotive, oil, steel, food, and other industries.

Automation evaluation chart makes it possible to check products, plant, methods, and costs and arrive at a score indicative of how automation might best be approached.

"Cut Costs With Automation" is issued by TAB Engineers, Inc., Dept. CP, Chicago, Milwaukee, and Ogden Aves., Chicago 22, Ill. When inquiring reader may simply specify CP 4378 on handy Reader Service slip located between pages 2 and 3.

Working pressures of 1000 psi handled by lube filters

High-pressure lubrication filters constructed of high tensile cast aluminum and built to withstand 1000 psi working pressure and 1800 psi test pressure are described in two-page bulletin. Dimensional material, illustrations, diagrams, and comprehensive data charts are included.

Bul 545 is issued by Trabon Engineering Corp., Dept. CP, 1814 E. 40th St., Cleveland, Ohio. Specify CP 4379, pages 2 and 3.

Gives technical information on cradle-mounted pumps

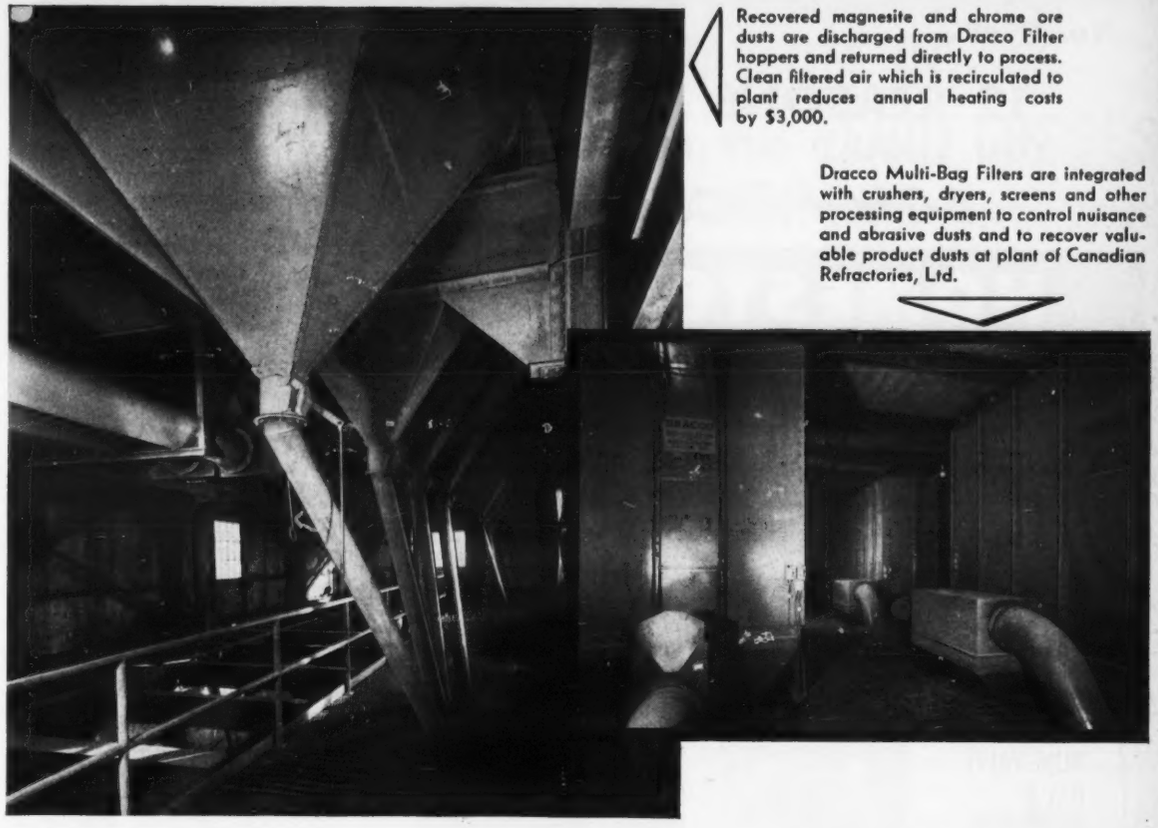
Basic design and construction features of cradle-mounted centrifugal, reciprocating, and rotary pumps are presented in four-page bulletin.

Bul 247 is issued by Warren Steam Pump Co., Inc., Dept. CP, 200 Bridges Ave., Warren, Mass. Specify CP 4380, pages 2 and 3.

Recommends applications of electrical ceramics

Electrical and mechanical properties of standard grades of electrical ceramics with recommended applications are included in four-page bulletin.

"Electrical Ceramics" is issued by General Ceramics Corporation, Dept. CP, 25 Crow's Mill Rd., Keasby, N. J. Specify CP 4381, pages 2 & 3.



Recovered magnesite and chrome ore dusts are discharged from Dracco Filter hoppers and returned directly to process. Clean filtered air which is recirculated to plant reduces annual heating costs by $3,000.

Dracco Multi-Bag Filters are integrated with crushers, dryers, screens and other processing equipment to control nuisance and abrasive dusts and to recover valuable product dusts at plant of Canadian Refractories, Ltd.

DRACCO PAYS *Annual Dividend* TO BRICK PLANT

Canadian Refractories Saves Over $40,000 Each Year Through Dracco Dust Control

Recovery of valuable product dusts and cost savings on plant heating—these are the bonus benefits Canadian Refractories, Ltd., is getting from the Dracco Dust Control System at its new Marelan (Quebec) plant.

To assure dust-free working conditions and to prevent wear of machinery by abrasive dusts, Canadian Refractories equipped this basic refractories plant with Dracco Dust Control Equipment when it was built.

Integration of five Dracco Multi-Bag Filters with crushers, dryers, screens and conveyors now provides efficient control of process dusts. But more than that, it makes possible savings on heating costs and the profitable recovery of valuable magnesite and chrome ore materials. In evaluating the bonus benefits of its Dracco System, Canadian's management estimates that it

(1) recovers magnesite, chrome ore and other dusts at an approximate rate of 100 tons per month.

(2) makes possible annual savings of some $3,000 in plant heating costs through recirculation of heated, filtered air.

The estimated tangible savings from product recovery and lower heating costs add up to *more than $40,000 each year.*

If you have a dust control or dust recovery problem, look into the dividend "pay off" you can get from a Dracco Dust Control System.

DRACCO CORPORATION
4070 East 116th St. • Cleveland 5, Ohio

Dracco 40-page Bulletin 800 contains complete technical information on "Industrial Dust Control and Recovery". Write for your copy today.

DRACCO *Performance Proved*
Airstream **CONVEYORS • DUST CONTROL EQUIPMENT**

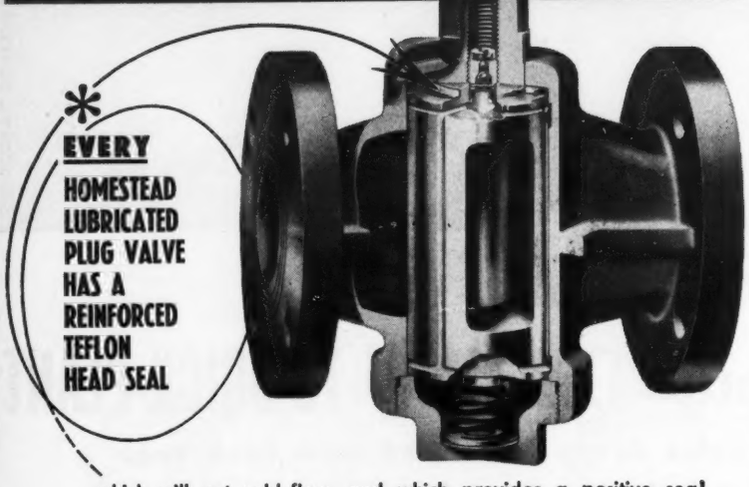
When inquiring check CP 4382 on handy form, pgs. 2-3

No. 1* of . . .

12 REASONS WHY
YOU SHOULD BUY AND USE
LOW-PRICED

HOMESTEAD
Lubricated
PLUG VALVES

Pat. Pending



. . . which will not cold-flow, and which provides a positive seal against leakage—even under 200 pounds pressure per square inch, *without lubrication*.

This is only **ONE REASON WHY** you should buy and use, *low priced* **HOMESTEAD LUBRICATED PLUG VALVES.**

HERE ARE ALL TWELVE

1. Reinforced Teflon head seal.
2. Completely controlled high-pressure lubricant system.
3. 100% pipe area or venturi patterns.
4. No spring torsional stress.
5. No mechanical adjustments.
6. Two lubricants handle most services
7. Extremely close tolerance between sealing surfaces.
8. Triple head seal.
9. Plug floated on Teflon washer.
10. Leak-proof double-ball and Lubricant-sealed check valve.
11. Full-threaded screw assures clean lubricant.
12. Extruding lubricant shows when system is full.

Without obligation, send REFERENCE Book 39—Section 5 on HOMESTEAD Lubricated PLUG VALVES.

NAME _____ TITLE _____

COMPANY _____

ADDRESS _____

CITY _____ STATE _____

HOMESTEAD VALVE MANUFACTURING COMPANY

Serving Since 1892

P. O. BOX 140 CORAOPOLIS, PA.

When inquiring check CP 4383 on handy form, pgs. 2-3

NEW LITERATURE

Gives protective coat even through rust

Series of protective coatings which will penetrate through rust to sound metal and form bond to stop further destructive action is discussed in four-page catalog. General information on coatings and their uses is given. Preparation of metal and masonry surfaces to be coated is discussed.

Form No. 53817 is available from Chemicals & Materials Corporation, Dept. CP, Terre Haute, Indiana. Specify CP 4384, pages 2 and 3.

Filters and accessories clarify water

Complete line of pressure filters and accessories for removing suspended solids such as dirt, iron, turbidity, oil, and color from water are illustrated and described in 16-page bulletin. Specifications, operating characteristics, outline dimensions, and installation photos are included.

Comprehensive and well documented, bulletin should be of interest to all engineers dealing with water problems.

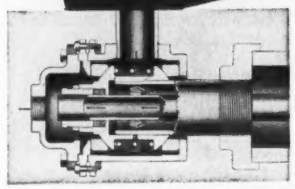
Bul 2225B is issued by The Permutit Company, Dept. CP, 330 West 42nd Street, New York 36, N. Y. When inquiring specify CP 4385 on handy form, pages 2 and 3.

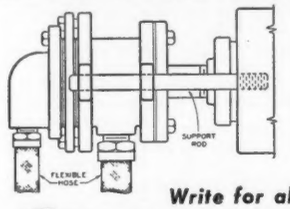
Describes and illustrates temperature controllers

Illustrated, two-page bulletin gives specifications on high and low temperature safety alarms and cut-outs up to 1000°F. Units operate by differential expansion of solids and use snap-action switches rated at 15 amps, 125-250v, 60 cy AC.

Bul 103 is issued by Burling Instrument Co., Dept. CP, 16 River Rd., Chatham, N.J. Specify CP 4386, pages 2 and 3.

NEW Type LN JOHNSON JOINT





To get steam or liquids into rotating rolls, and get condensate out again, the Johnson Joint has proved the most efficient answer yet devised. For those special jobs where an inlet or outlet pipe must rotate with the roll—on double drum dryers, paper machine dryers, etc.—the Type LN is big news. It has been redesigned now for lighter weight, lower cost, longer operating life. Its simple mounting meets most conditions, provides a "floating action" that takes full advantage of the built-in flexibility.

Cross-section view shows packless, self-lubricating, self-adjusting design of Type LN Johnson Joints. Internal pipe rotates with roll or drum. Drawing shows how lugs cast on body permit simple rod support; rotating assembly "floats" free of the weight of body and connections.

Write for all the facts about the LN

The Johnson Corporation

826 Wood St., Three Rivers, Mich.

When inquiring check CP 4387 on handy form, pgs. 2-3

LENAPE
STUDDING OUTLETS
offer many advantages

Curved Studding Outlets or Pads in ASA sizes and standards provide reinforcement of the shell opening. Studding outlets, naturally short in height and providing reinforcement of the opening, have design appeal, economy in price and fabrication, and advantages in use.

Important applications include interdeck access openings on small diameter towers or columns, boiler mountings, clean-out or observation ports, and similar uses in close-clearance locations.

Sizes 16" and larger (even to 30" I.D.) are ideal access openings and in 18" and 20" sizes are the most modern and economical manway for LPG tanks.

Complete standards on pages 32-33 of Lenape Catalog 9-49.

LENAPE HYDRAULIC PRESSING AND FORGING CO.

LENAPE HYDRAULIC PRESSING & FORGING CO.
DEPT. 100 WEST CHESTER, PA.
RED MAN PRODUCTS

When inquiring check CP 4388 on handy form, pgs. 2-3

Catalogs protective coatings

Prepared in easy-to-read outline form, catalog contains important facts about protective coatings and their many industrial applications. Use of company's coating to protect equipment from corrosion and abrasion is fully described. Sections of catalog list coatings and uses and outline various industries where particular applications are desirable.

Catalog on Magic-Vulc is issued by Dept. N20, Magic Chemical Co., Dept. CP, 121 Crescent St., Brockton, Mass. When inquiring specify CP 4389 on handy form, pages 2 and 3.

Presents information on methanol in tabular and graphical form

Physical properties of methanol, along with storage and handling information and a discussion of uses, is given in 16-page technical data sheet. Fourteen graphs on vapor pressures, specific gravities, boiling and freezing points, viscosities, and other properties of aqueous and non-aqueous solutions are presented.

Bul F-8141 "Methanol" is issued by Carbide & Carbon Chemicals Co., a div. of Union Carbide & Carbon Corp., Dept. CP, 30 E. 42nd St., New York 17, N.Y. When inquiring specify CP 4390 on handy form, pages 2 and 3.

Describes, illustrates chambers for temperature testing

Illustrated four-page bulletin gives specifications and operating instructions for temperature test chambers. Included are circuit and airflow diagrams and replacement parts list.

"Temperature Test Chamber Model TC-2" is issued by Statham Development Corp., Dept. CP, 12411 W. Olympic Blvd., Los Angeles 64, Calif. Specify CP 4391, pages 2 and 3.

Illustrates line of rubber gloves and other protective apparel

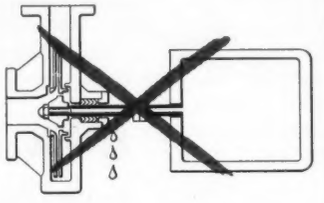
Rubber gloves, aprons, sleeves, leggings, and other protective apparel are illustrated and described in four-page bulletin. Graphs on tensile strength, snag resistance, and increase in volume (swelling) are included in bulletin.

"Sureseal" Bulletin is issued by Surety Rubber Co., Dept. CP, 128 Hall Ave., Carrollton, Ohio. Specify CP 4392, pages 2 and 3.

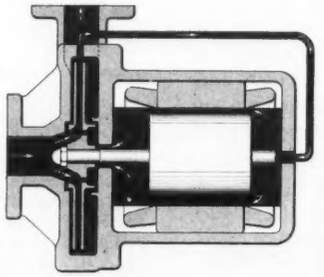
"CANNED ROTOR" PUMPS PAY OFF IN LOW UPKEEP COSTS, NO FLUID LOSSES

UNIQUE CHEMPUMP DESIGN SAVES TRICHLORETHYLENE USER $45 A DAY

Philadelphia, Pa. Officials of a large electrical switchgear manufacturer recently stated that $45 per day savings of trichlorethylene resulted from installing a Model CF Chempump on a distillation-type degreaser. Fluid losses with the ordinary centrifugal previously installed averaged 25 gallons a day. "On top of this," they stated, "we had to repack the pump every two days. We'd tried all kinds of packing, some of them very expensive—but without luck. Since installing the Chempump, we haven't lost a drop of solvent, and there has been absolutely no maintenance."



Design secret of the Chempump lies in combined construction of pump and motor, which eliminates seals, stuffing boxes, lubrication, long external shafts, etc. The Chempump allows pumped fluid to enter rotor chamber; a corrosion resistant liner isolates stator windings. Chempumps are available in sizes from ⅛ to 7½ horsepower, and in a wide variety of construction materials.



NUCLEAR SERVICE REQUIREMENTS SPUR LEAK-PROOF PUMP PRODUCTION

Less than two years ago, only one company in the country was producing and marketing a canned-rotor pump. Today, spurred on by the atomic energy program, half a dozen firms are at work on models for atomic-powered submarines, nuclear energy central stations, even atomic-powered aircraft.

To the man in the chemical process industries, all this is good news, because canned-rotor pumps can't leak. They require no shaft seals or stuffing boxes, maintenance is practically nonexistent. And leakage losses, high maintenance costs are two of the biggest headaches centrifugal pump users face.

H. T. White and D. P. Litzenberg (left), developers of the first practical seal-less "canned-rotor" pump. On the desk are plans for an extreme-pressure, extreme-temperature design.

Canned-rotor pumps came about through the efforts of two young Philadelphia engineers, now officers and directors of the Chempump Corporation. Working on principles developed before World War II, they did further research and engineering, and in 1947 began production of a seal-less, canned-rotor pump.

Even while tooling up for production of this first model, the two designers were planning variations for specific applications in the chemical process industries. Pumps were built to handle extreme temperatures and pressures as well as a variety of corrosive fluids. The pumping requirements of chemical processors were carefully studied, and steps taken toward standardization of designs to meet those requirements.

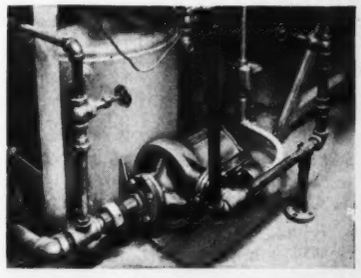
1952 saw the formation of the Chempump Corporation to build canned pumps for the chemical process industries. Experience gained from nearly 15 years of laboratory and field testing went into the design and production of products offered by this corporation. First in the field of canned-rotor pumps, Chempump is also first with pumps tailored specifically to the chemical processing industry.

PUMP SERVICE POLICY ENDS MAINTENANCE PROBLEMS

To reduce process downtime, many plants purchase a spare pump for every two, three, or five pumps installed, depending on circumstances. We feel this is a good policy, since downtime is limited to the time required to install a spare.

But what about repairing the faulty pump? Are proper spare parts on hand? How about maintenance department scheduling? The answer to these and other problems is the Chempump Service Policy. Any Chempump, damaged or inoperative for any reason—including improper pump application—will be repaired at the factory and returned to the customer with a new pump warranty. The pump is completely rebuilt, inspected and tested by factory experts . . . and the cost is moderate.

This service policy stops repair headaches, cuts spare parts inventory, and in effect, places a new pump on your shelves in short order.



Chempump handling condensate under extreme vacuum for large Eastern chemical manufacturer. Air contamination would render system inoperative.

Chempump First in the Field

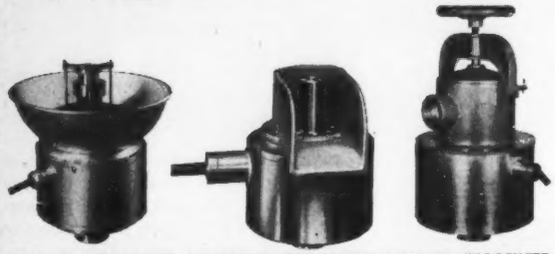
CHEMPUMP CORPORATION
1354 EAST MERMAID LANE • PHILADELPHIA 18, PA.

When inquiring check CP 4393 on handy form, pgs. 2-3

FRANTZ FERRO-FILTER®

for MAGNETIC SEPARATION of

WET MATERIALS



GRAVITY FERROFILTER UNDERFEED FERROFILTER PIPELINE FERROFILTER

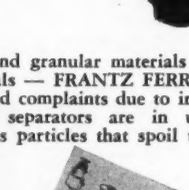
DRY MATERIALS

Model 88V

DRY FERROFILTER with Vibrator

Model 68V

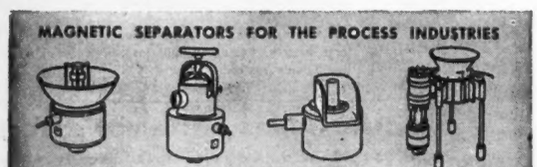
If you handle slurries or powdered and granular materials in your processes — or sell such materials — FRANTZ FERRO-FILTERS will help eliminate losses and complaints due to iron contamination. Thousands of these separators are in use throughout industry, extracting ferrous particles that spoil the finished product and cause damage to pumps, valves, rolls and other processing equipment. For complete information—



Send for BULLETIN 46-E

S. G. FRANTZ CO., Inc.

P. O. Box 1138, Trenton 6, N.J.



When inquiring check CP 4394 on handy form, pgs. 2-3

NEW LITERATURE

German iron castings illustrated

Stuhlen (German) corrosion-resistant and heat-resistant iron castings (tanks, pipes, valves, and others) are described and illustrated in six-page bulletin. Also discussed is a ferro silicon alloy, Siferrid. Charts list its reactions to various acids at different temperatures.

Stuhlen Bul No. 1 is available from Neumann & Welchman, Inc., Dept. CP, 22-12 Raphael St., Fair Lawn, N. J. When inquiring specify CP 4395 on handy form, pages 2 and 3.

Roof maintenance in a package

Provision of essential roof maintenance materials and tools in convenient package units is discussed in four-page folder. Two packages are offered: one for complete roof resurfacing, and the other for repairs. Packages contain roofing membrane, coating, and necessary tools for application.

Folder on packaged roofing materials is available from Lexsuco, Incorporated, Dept. CP, 4815 Lexington Ave., Cleveland 3, Ohio. Specify CP 4396, pages 2 and 3.

Swivel pipe couplings rotate in 3 planes

Bulletin of six pages briefly describes company's swivel couplings which are available in eight basic types for rotation in 1, 2, and 3 planes for high- and low-temperature applications at pressures to 15,000 psi, in pipe sizes from ⅜ to 12".

Cat 234L is issued by H & N Manufacturing Corp., Dept. CP, 3528 Union Pacific Ave., Los Angeles 23, California. When inquiring specify CP 4397 on handy form, pages 2 and 3.

24,000 Now Read SHRIVER Filter Facts

Why Not You?

IT'S FREE

Shriver Filter Facts contains useful ideas and developments on methods and equipment for filtration and fluids handling. It's interesting, brisk, terse. Small wonder that the number of readers (by their own request) has grown from 10,000 to 24,000 in 4 years.

The current issue includes articles on Factors Affecting Selection of Filters — Creative Imagination in Improving Industrial Processes—Effect of Abrasion on Pumping Costs—Sluicing Filter Cake—and more.

Get on our mailing list for this and future issues of Filter Facts. No obligation.

T. SHRIVER & COMPANY, INC. • 846 Hamilton St., Harrison, N.J.

Filter Presses · Filter Media · Diaphragm Pumps

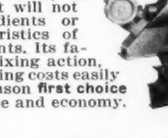
When inquiring check CP 4398 on handy form, pgs. 2-3

MIX IT better ...MIX IT faster with a MUNSON ROTARY BATCH MIXER

...the TUMBLING ACTION mixer for intimate blending of dry ingredients

A Munson Rotary Batch Mixer provides faster, more intimate blending of dry ingredients — yet will not stratify ingredients or alter characteristics of basic components. Its famous 7-way mixing action, plus low operating costs easily makes the Munson first choice for performance and economy.

EXCLUSIVE MULTIPLE-BLENDING ACTION!



Lifters continuously cut out and lift ingredients as drum slowly revolves. Rotating cone tumbles stock to center. Conveyor flights on mixer shaft also agitate stock back to center — where mixing cycle repeats. Empties completely after every mix.

UNEQUALLED FOR DRY MIXING OF:

Chemicals, Fertilizers, Feeds, Cereals, Gelatin, Glue, Soap Compounds, etc.

Munson Rotary Batch Mixers can be fitted with internal spray for introduction of limited amount of liquid. Mixers range in capacities from 40 to 200 cu. ft. — for working floor, overhead or basement installation.

Skilled Munson engineers will be glad to help you solve your mixing problem. Write us today . . .

Other famous MUNSON products: Rotary Knife Cutters, Hammer Mills, Attrition Mills, Rotary Crushers . . .

MUNSON MILL MACHINERY CO. Dept. P-1254 Utica, New York

When inquiring check CP 4399 on handy form, pgs. 2-3

Unplasticized polyvinyl chloride in valves, other equipment

Needle and globe valves of unplasticized polyvinyl chloride are featured in two-page bulletin. Supplementary data include descriptions of nuts and bolts, pails, dippers, and pitchers for handling highly corrosive materials. Corrosion-resistant pipe sealing compound suitable for use in plastic and metal piping is also discussed.

Bulletin on unplasticized polyvinyl chloride valves and other equipment is issued by Industrial Plastic Fabricators, Endicott Street, Norwood, Mass. Specify CP 4400, pages 2 and 3.

Catalogs acid- and caustic-resistant industrial work clothes

Illustrated 12-page catalog shows line of acid- and caustic-resistant work clothing. Matching shirt and pants, coveralls, and laboratory coats are included. Catalog contains tables on technical properties of Orlon acrylic fiber and Dynel, materials from which these clothing items are made.

1954 Catalog on industrial apparel is issued by Dept. K, Worklon, Inc., Dept. CP, 253 W. 28th St., New York 1, N. Y. When inquiring specify CP 4401 on handy form, pages 2 and 3.

German patents for textiles listed in bulletin

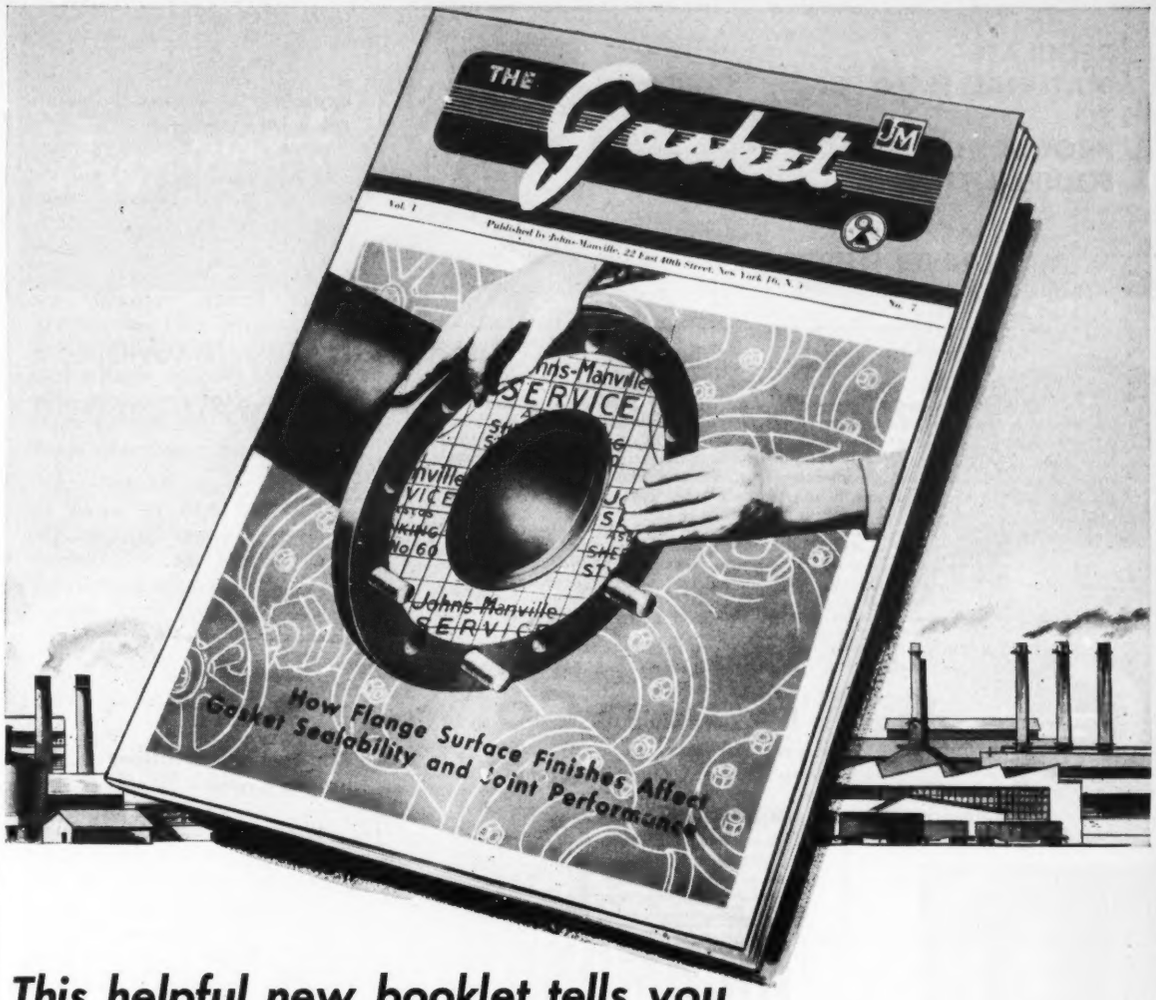
Divided into two main sections, surface-active agents and finishing agents and other aids, bulletin lists English translations of German patents, patent applications, and manufacturing processes for textile auxiliaries.

"Chemicals for Textiles" (Bul No. 89) is issued by Research Information Service, Dept. CP, 53 Nassau St., New York 38, N.Y. When inquiring specify CP 4402 on handy form, pages 2 and 3.

Describes methods of multi-unit load handling with lift trucks

Moving and storing of many multi-unit loads by pallet hand lift trucks is pictured and described in attractive 12-page brochure. Illustrated with application photographs, brochure features section describing different pallet types.

Bul P-673B is published by Yale & Towne Mfg. Co., Dept. CP, 11000 Roosevelt Blvd., Philadelphia 15, Pa. When inquiring specify CP 4403 on handy form, pages 2 and 3.



This helpful new booklet tells you

How flange surfaces affect gasket performance

IF YOU BUY, specify or design joints requiring gaskets, you will find helpful information in this new booklet. It provides a basis for selecting the flange surface finish most suitable for a given gasket. It explains why the right finish makes it easy to form the initial seal and obtain the best joint performance in service.

This booklet is the latest in a series of technical publications issued by Johns-Manville under the collective title "The Gasket." It is based on studies made at the Johns-Manville Research Center, largest laboratory of its kind in the world. It incorporates the long experience of Johns-Manville engineers in the design of gaskets such as asbestos, fibre and composition types, asbestos-metallic and all-metal gaskets.

Booklet offered without charge

To secure your copy of this study, write for "The Gasket," PK-48A No. 7. Address Johns-Manville, Box 60, N. Y. 16; in Canada, 199 Bay St., Toronto 1, Ont.

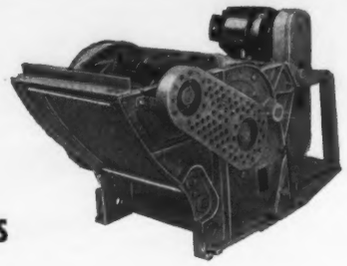
JOHNS-MANVILLE JM PRODUCTS

Johns-Manville PACKINGS & GASKETS

When inquiring check CP 4404 on handy form, pgs. 2-3

REGULATE MATERIAL FLOW TO PRODUCTION EQUIPMENT

DRAVER FEEDERS



You can safely operate sifters, elevators, grinders, dryers and other production equipment at maximum efficiency without danger of over-loading, when you regulate capacity with an accurate, dependable Draver Feeder. You save power and production time, and avoid excessive wear on your equipment.

Sturdy Draver Feeders are made in more than 100 sizes and models, to feed a continuous, uniform stream of most any dry powdered, granular or crystalline material — even stubborn, nonfree-flowing products. Original cost and operating expense of Draver Feeders are low, compared with the production losses they prevent.

Send data on your capacity regulating requirements, and let our engineers give you detailed information and specifications. No obligation.

Complete information and recommendations on request. Write today.

FEEDING · MIXING · SIFTING · GRINDING · WEIGHING · PACKING and PACKAGING EQUIPMENT FOR THE PROCESS INDUSTRIES

B. F. GUMP CO.

Engineers and Manufacturers since 1872

1344 S. Cicero Avenue, Chicago 50, Illinois

When inquiring check CP 4405 on handy form, pgs. 2-3

RICHMOND super-sifter

"... doing a better job ..." in a Wood Flour Mill

Mr. James B. Stamps, Vice-President, Allen-Rogers Corporation (turned wood products) recently wrote:

"Our new flour mill has been in operation for something over a year now, and we have had an opportunity to observe closely the results which we are obtaining from the sifter, magnets, and stream splitter which we purchased from your company.

"We are very happy to tell you that in all cases these are performing satisfactorily and are indeed doing a better job than any other similar devices which we have used in the past."

Perhaps your plant can profit from the use of RICHMOND SIFTERS, too.

R-21

RICHMOND MANUFACTURING COMPANY

AFFILIATED WITH NOVADEL-AGENE CORP.

LOCKPORT, NEW YORK

When inquiring check CP 4406 on handy form, pgs. 2-3

NEW LITERATURE

Explains, illustrates controls for sulfite digester

Application bulletin for pulp and paper industry explains control systems for sulfite digester. Illustrated bulletin covers such subjects as chip charging by weight, acid density recording, acid accumulator level and temperature recordings, batch control for acid charging, digester level and temperature recording, steam admittance control, top relief control, and remote valve operation.

Bul 90-130-16 is issued by Fischer & Porter Co., Dept. CP, 400 County Line Road, Hatboro, Pa. When inquiring specify CP 4407 on handy form, pages 2 and 3.

Presents specifications on lab ovens

Illustrated eight-page folder with 14-page insert outlines complete specifications on electric laboratory ovens. Larger ovens for production lines are also illustrated and described. Folder has sample of metal with baked-enamel finish.

Bul 100 is issued by Despatch Oven Co., Dept. CP, 619 S. E. 8th St., Minneapolis, Minn. When inquiring specify CP 4408, pages 2 and 3.

Describes complete line of pressure transducers

Transducers for measurement of gage, differential, and absolute pressures are pictured and described in 12-page bulletin. Bulletin includes drawings, specifications, and selection tables for eight models designed for pressures from 0-0.5 to 0-10,000 psi.

Bul PT-1 issued by Statham Laboratories, Inc., Dept. CP, 12401 W. Olympic Blvd., Los Angeles 64, Calif. Specify CP 4409, pages 2 and 3.

NON SOLUS

Essential for The Industrial Lab

SOLVENTS MANUAL

Cyril Marsden Technical Services Department
British Industrial Solvents
a Division of the Distillers' Company, Limited

The Most Comprehensive & Accurate Reference of Industrial Solvents ever Published

In this 440-page work more than 200 industrial solvents are discussed:

Physical and Chemical Properties — Source and Manufacture — Industrial Grades — Azeotropes — Physiological Properties — Storage & Handling — Manufacturers

In addition to many charts and tables, this fine book has a separate index of trade and proprietary names (as used in the United States and England), a table illustrating the various stages of toxicity at different levels of concentration, and, as a special convenience, a large Solubility Chart (wall size, 22½ x 35") which shows at a glance the actions of some 250 solvents on about 150 solutes of current industrial importance.

***Solvents Manual* will earn its place immediately in the chemical industry as a working laboratory and field reference. Order your copy through your bookseller now, or direct from Elsevier. Available on 10-day trial basis, of course.**

Solvents Manual 6¼ x 10 1954 $12.95

The ELSEVIER PRESS

402-CP Lovett Blvd. Houston 6, Texas

Houston • New York • Amsterdam • London • Brussels

When inquiring check CP 4410 on handy form, pgs. 2-3

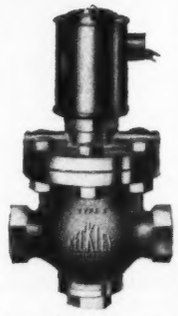
NEW SOLENOID VALVE CUTS MAINTENANCE COSTS WITH:

RENEWABLE PARTS · EXTRA SERVICE LIFE · DESIGN SIMPLICITY

• The *new* Type E pilot operated Keckley Solenoid Valve really cuts costs in the maintenance department. Simplicity of design minimizes the number of parts subject to wear. Each part of the valve is held to rigid manufacturing specifications to assure you of top quality workmanship and materials and to give the valve extra years of service.

When parts wear, replacement is simple and economical. A new cylinder liner can be installed in minutes as can valve seats, pistons and other parts.

For details and prices on all Keckley products, write for Catalog 54-B.



Standard valves are furnished in sizes ½" to 6", suitable for steam at 250 psi and air, water, oil and gas at 600 psi.

O. C. KECKLEY COMPANY

400 W. Madison St. • Chicago 6, Ill.

KECKLEY CHICAGO

Pressure Regulators • Temperature Regulators • Float Valves
Diaphragm Valves • Safety and Relief Valves • Solenoid Valves

When inquiring check CP 4411 on handy form, pgs. 2-3

Photographs highlight catalog on bulk storage tanks

Bulk storage tanks — horizontal, underground, and vertical — are described in 16-page catalog. Complete with drawings, photographs and tables, literature lists specifications, shows construction and actual installations of tanks. Manufacturer's shop facilities are also pictured and described.

"Bulk Storage Tanks" is issued by Graver Tank and Manufacturing Company, Inc., 4809-11 Tod Avenue, East Chicago, Indiana. Specify CP 4412, pages 2 and 3.

Properties and applications of MoS_2 as lubricant

Lubrication by solids is discussed in four-page technical paper. It is held that thin oxide films formed on most metals act as lubricants, reducing friction by substantial amounts. By alloying them with more highly qualified solid lubricants such as molybdenum disulfide, lubrication can be improved. Details are presented in the paper.

"Lubrication Properties and Industrial Applications of Pure Molybdenum Disulfide" is available from The Alpha Corp., Dept. CP, 179 Hamilton Ave., Greenwich, Conn. When inquiring specify CP 4413 on handy form, pages 2 and 3.

Economical boiler blow-off described in bulletin

Descriptive 12-page bulletin describes automatic continuous blow-off equipment which is furnished in four typical arrangements. Units provide economy of fuel, smaller quantity of blow-off, elimination of foaming and priming, reduction of make-up requirements, continuous blow-off and less strain on boiler metal. Typical arrangements are illustrated together with cost-saving examples.

Bul 2391A is available from The Permutit Company, Dept. CP, 330 West 42nd Street, New York 36, N. Y. Specify CP 4414, pages 2 and 3.

Furnishes performance data on lab heating jacket tube

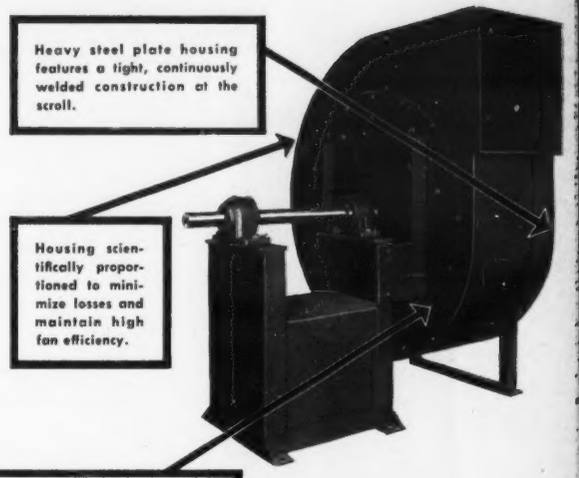
Illustrated eight-page bulletin provides performance data, heat and energy distribution curves for coated glass tubes used for heating jackets.

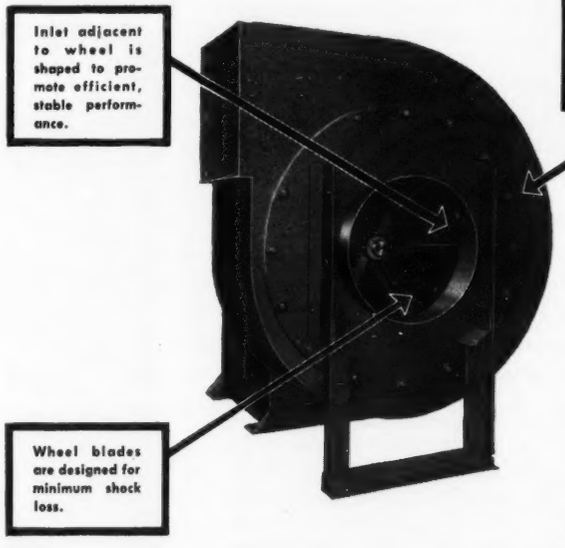
"E-C Coated Tubes" is issued by Corning Glass Works, Dept. CP, 1949 Crystal St., Corning, N.Y. Specify CP 4415, pages 2 and 3.

Announcing **the new Clarage TYPE XL Industrial Fans**

Exceptional Fan Equipment distinguished by:

1. High efficiency characteristic.
2. Rugged, tight construction.
3. Three interchangeable wheels — each with radial blades.
4. Large size range — 11″ through 60″ inlet diameters.
5. Pressures to 18″ SP; volumes to 130,000 CFM.


Heavy steel plate housing features a tight, continuously welded construction at the scroll.
Housing scientifically proportioned to minimize losses and maintain high fan efficiency.
Adjustable to any of eight standard discharges by merely removing tap bolts on each side and rotating the housing between the sideplates.


Inlet adjacent to wheel is shaped to promote efficient, stable performance.
Wheel blades are designed for minimum shock loss.

Type XL fans shown here are typical of the smaller sizes which provide universal discharge. Larger sizes are of reinforced sheet steel and base angle construction extending to the foundation line.

Send for Bulletin 702

A new, modern design offering many distinct advantages!

Clarage Type XL industrial fans are particularly well suited for diversified air and material handling applications. You'll profit from the high efficiency, in-the-field adaptability, and numerous other features of this exceptional fan equipment.

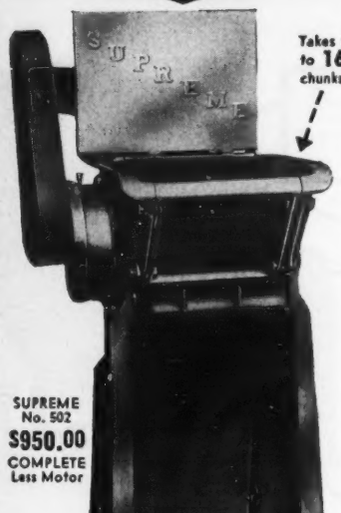
Learn more about these distinguishing features by requesting Bulletin 702, or contacting the nearest Clarage application engineering office.

CLARAGE FAN CO., Kalamazoo, Mich.

You can Rely on...
CLARAGE
Headquarters for Air Handling and Conditioning Equipment
SALES ENGINEERING OFFICES IN ALL PRINCIPAL CITIES • IN CANADA Canada Fans, Ltd., 4288 Richelieu St., Montreal

When inquiring check CP 4416 on handy form, pgs. 2-3

CRUSH WAX AND RESINS to Speed Processing



CRUSHES ANY MATERIAL
Hard, Soft, Resinous, Waxlike, Brittle, Lumped, Caked, Granular.

FOR WAX, SPONGE IRON and
Rosin, DDT, Resins, Asphalt, Salts, Glass, Chocolate, Asbestos, etc.

DESIRABLE OUTPUT, FEW FINES
Positive Chopping Action. Feed and Discharge are Automatic.

RUGGED, HEAVY DUTY "SUPREME"
Many in Continuous Service for 35 Years . . . Results Guaranteed.

Free Test Run — Send 50 Pounds
Your Material. Crushed to Desired Size, Returned.

Since 1918—"Supreme" Standard Crushers Range of Standard Models to meet your needs; from $425. Immediate Shipment.

SUPREME CRUSHERS

Mfd. by Franklin P. Miller & Son, Inc.
36 MEADOW ST., E. ORANGE 2, N. J.

When inquiring check CP 4417 on handy form, pgs. 2-3

NEW LITERATURE

Solids 8 mesh and finer graded in hydraulic classifier

Physical characteristics, automatic control mechanism, theory, method of operation, applications, and advantages of hindered-settling hydraulic classifier are described in six-page bulletin. Used for sizing and grading of eight mesh and finer solids, unit incorporates new design features which are said to result in more effective use of hydraulic water to produce clean, deslimed fractions sized within narrow limits.

Also included in bulletin are wash and line drawings and photographs of typical units. Unit is available with any number of pockets ranging from 1½ to 21½.

Bul 2342 is issued by The Dorr Company, Dept. CP, Barry Place, Stamford, Conn. When inquiring reader may simply specify CP 4418 on handy form, pages 2 and 3.

Physical and chemical data on surface-active agents

Nonionic surface-active agents offer a wide range of properties which can be used to advantage in detergents, emulsions, paint removers, and other applications. Physical and chemical data on Synthetics AF, AR, and AD series of nonionics are tabulated in folder.

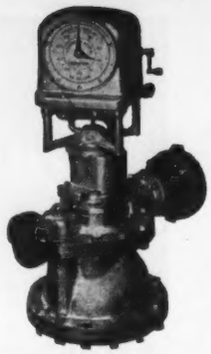
"Nonionic Surface-active Agents" is issued by Synthetics Dept., Hercules Powder Co., Inc. Dept. CP, 940 Market St., Wilmington 99, Del. When inquiring reader may simply specify CP 4419 on handy form, pages 2 and 3.

Airless cleaning method used in blasting machines

Line of machines for batch blast cleaning of castings, forgings, and heat-treated parts is described in 16-page bulletin. Specifications, dimensional plan views, and elevations of machines are given as well as maximum weight per piece, maximum weight per load, and motor specifications.

Illustrated with photographs and drawings, bulletin explains how production savings may be realized with machines. Units are made in six sizes — from 1½ to 27 cu ft capacity. Cleaning is done by abrasives, using airless method.

Bul 225 is issued by the Pangborn Corporation, Dept. CP, 2700 Pangborn Blvd., Hagerstown, Md. When inquiring reader may simply specify CP 4420 on the convenient Reader Service slip which is located between pages two and three.



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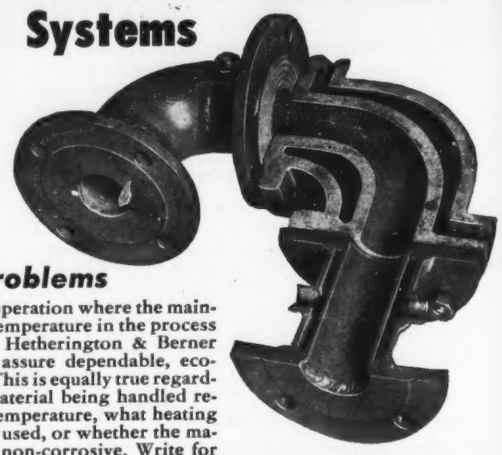

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Discussed in this issue —
PROCESSES, EQUIPMENT *and* MATERIALS

Use this "quick-locator" when you want information on a specific type of process, equipment or material mentioned in the processing stories or the advertisements in this magazine. Everything discussed in this issue is given here—if you want more data you can write manufacturer direct . . . or turn to pages 2 and 3 and use the handy "Information Request Slip." This is a special service provided by the publisher . . . no obligation or charge, of course. The publisher contacts the proper manufacturers for you—information comes to you direct.

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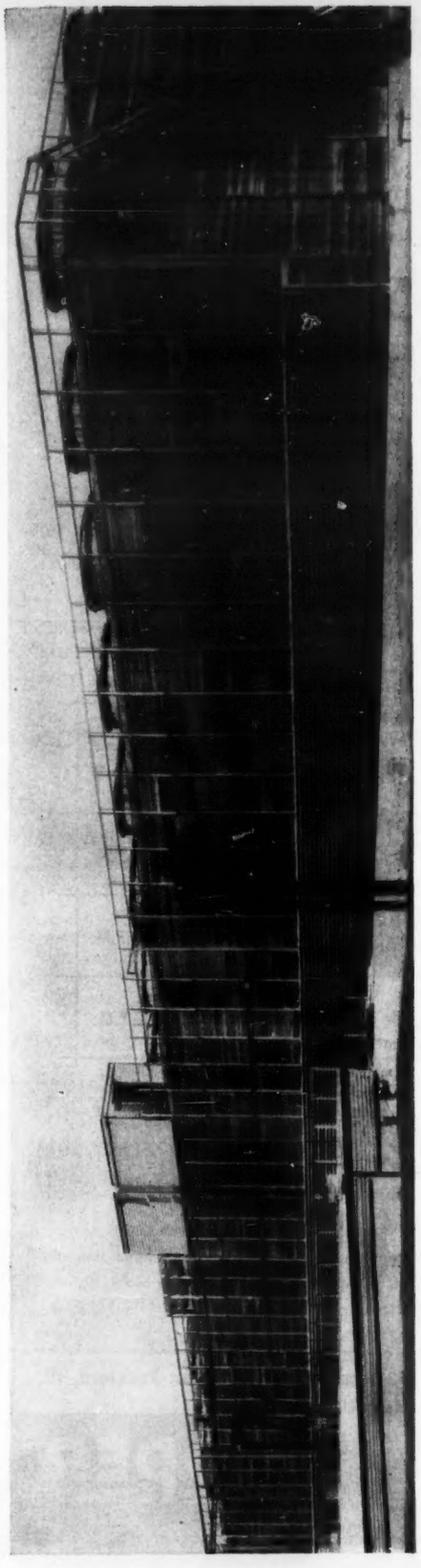

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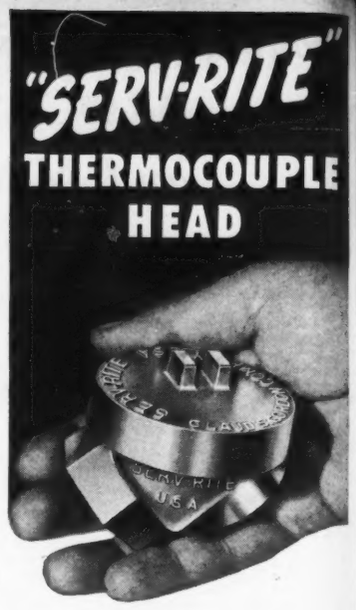

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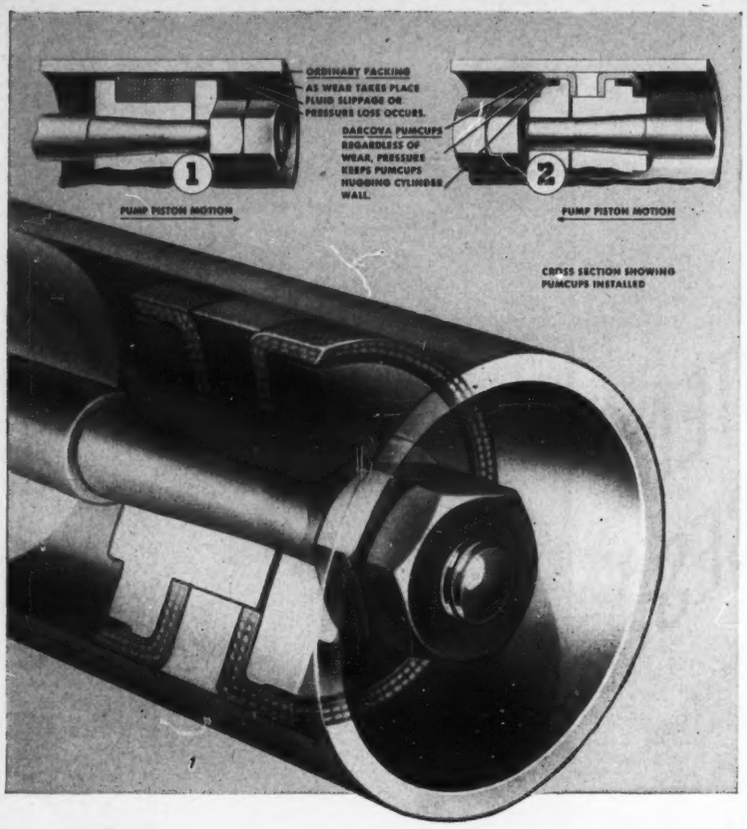
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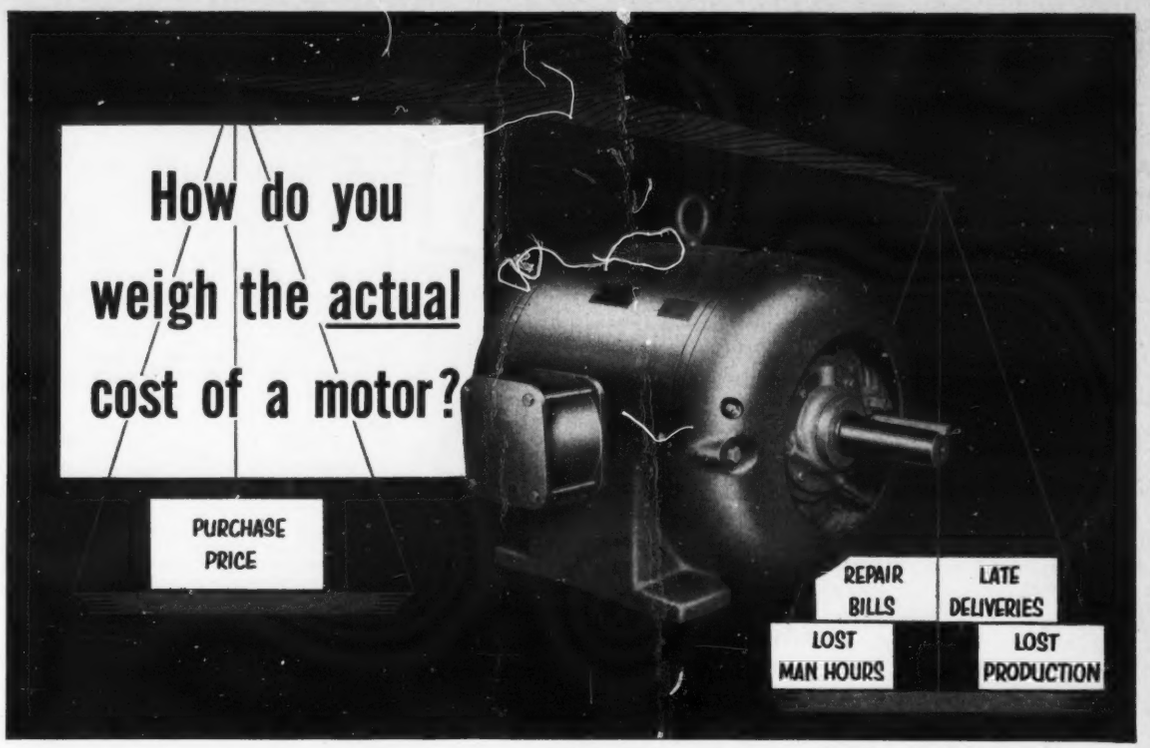

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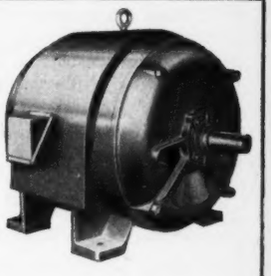

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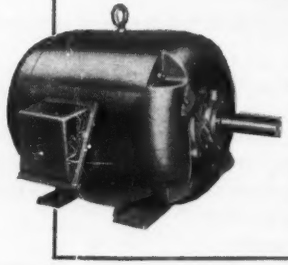

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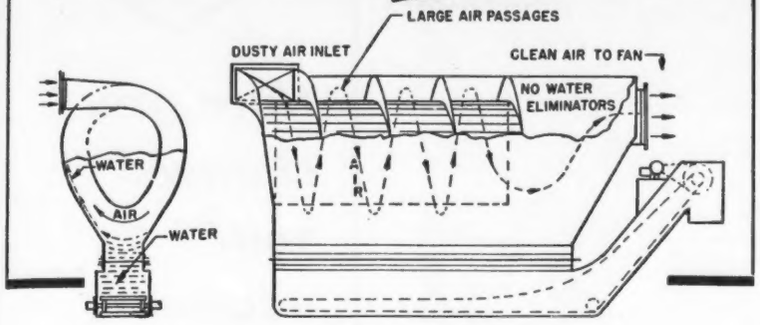

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NEWS from FILTERTOWN

A boon to the filtration of beer is the successful development by the E&D laboratories of a new, high wet strength filter paper that is 25 times stronger than most any filter paper ever known. Yet, it is sufficiently porous to permit the rapid filtration of as many as 150 barrels per hour. BREW-BRITE (registered name) effects tremendous savings in time and money. And the brewmasters are delighted with the "high polish" obtained that is so essential for today's modern beer . . . A new, disposable cigarette filter tip, using E&D filter paper, grade 613, is gaining popularity . . . Great publicity achieved by E&D's "no-rattle" paper grade 914, used by radio and TV announcers and actors, which eliminates the bothersome sounds made by ordinary paper . . .

T. J. Druding, sales manager, announces enthusiastic acceptance of Filtration Analysis Report, designed to help industry with solution of specific filtration problems. If you would like to determine if filter paper can be of help to you, and how it will work on your filter press, with the great savings that filter paper can show over any other filter media, write for a free copy of Filtration Analysis Report or for free samples of filter paper . . . Not generally known is the fact that E&D was established in 1890; that E&D pioneered in folded filter circles; and that it is the only company in America exclusively devoted to the making of filter papers for science and industry . . . Formula for savings:

Cost of filter paper in relation to cost of filtration is .0001 or less!

E&D FILTER PAPER

THE EATON-DIKEMAN CO.
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When inquiring check CP 4431 on handy form, pgs. 2-3

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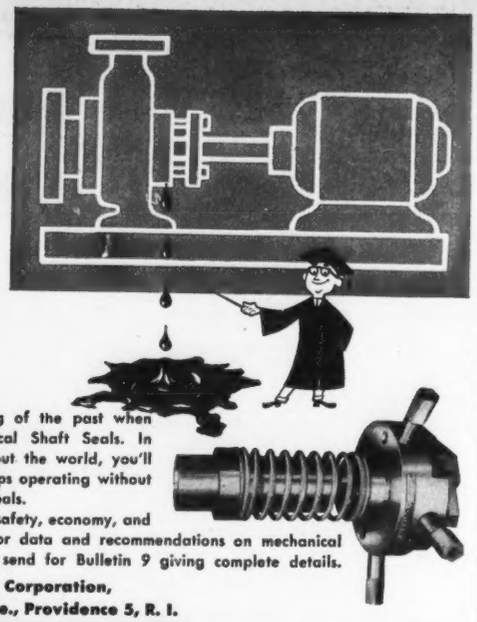

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THAT'S INTERESTING

Log-log deci TWIG

An instrument, called a dendrograph, which measures and records growth and other minute changes in the size of tree trunks has been developed. It is mounted on a tree in such a way that increases or decreases of less than one-

half of 1/1000" in the trunk size are recorded. Errors from temperature change, wind stress, or other disturbances are eliminated by a special mounting of the mechanical system.

The instrument was developed by Harold Fritts, a graduate student at Ohio State Univ., and his father, Dr. E. C. Fritts, a physicist with Eastman Kodak.

Re-shoeing old soles

Reporting on progress being made in the production of rubber goods, a Dutch scientist at the Rubber Technology Conference in London summed up by stating that the time has come when instead of re-soling old shoes it is necessary to re-shoe old soles. (*Rubber Age*)

Twist of wrist chips ice

A freezer tray, closely resembling an ice cube tray, is so designed that it produces finely chipped ice at a twist of the wrist. Tray is made with du Pont's "Alathon" 10 polyethylene resin.

For more information on product at right, specify CP 4434 . . . see information request blank between pages 2 and 3.

CALIBRATED IMPELLER provides a basis for accurate speed-diameter-horsepower plottings. The power characteristics of the impellers are known completely, from thousands of test runs.

THE OPTIMUM FLUID regime to achieve the wanted process result is determined and is then scaled up to full size, by one of several methods that give fully predictable results.

How to get optimum results in liquid-liquid contacting

There's a systematic way to get top efficiency in any conceivable liquid-liquid (or gas-liquid) contacting operation.

It begins with the mixer impeller. The one you see here is a LIGHTNIN design chosen for high pumping capacity, or fluid flow.

Flow is what circulates the droplets (or gas bubbles) in a controllable pattern, assuring intimate contact throughout the fluid mass.

You need *fluid shear*, too. Shear breaks the big droplets (or bubbles) into millions of pinpoint ones, tremendously increasing interfacial area.

For optimum results, you need *flow* and *shear* in just-right balance. These are basic, though many other variables may affect the final answer.

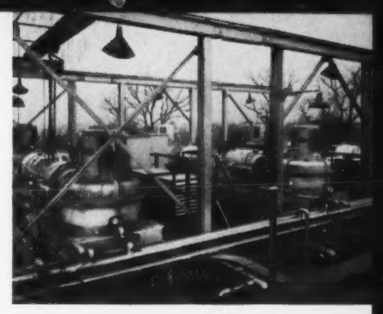
The MIXCO engineer can de-emphasize *flow* and emphasize *shear* (or vice versa) by varying the size and speed of the calibrated impellers he works with.

He can quickly find the optimum speed and diameter that will give you the results you want in least time—and with least horsepower. There's no guesswork.

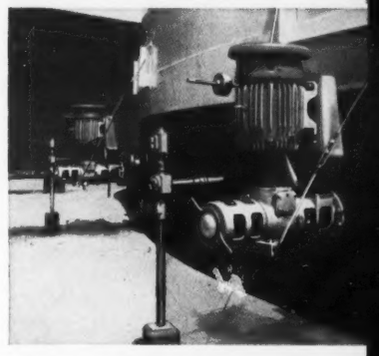
The answer can be extrapolated to *any* size system, with extreme accuracy. Results are unconditionally guaranteed.

In any fluid mixing operation, we can help you harness fluid flow and fluid shear, control them, make them work harder—often with 100% more mixing efficiency. You may save weeks of research and pilot plant time by asking us to come up with the answer.

If you'd like more specific information on fluid mixing that does what you want it to do, just call in your LIGHTNIN representative, or write us today.



ANTIBIOTIC FERMENTATION is big example of gas-liquid contacting operation. This one consists of six 200-HP LIGHTNIN Mixers, with 39-foot shafts, on six 24,000-gallon tanks.



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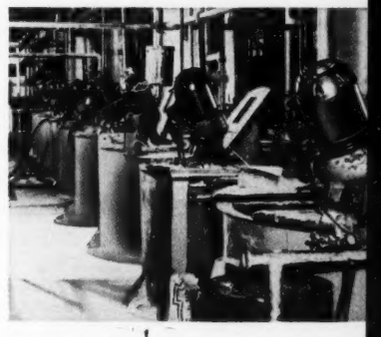

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